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(12) INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

(19) World Intellectual Property Organization
International Bureau

(43) International Publication Date
8 March 2001 (08.03.2001)

PCT

(10) International Publication Number
WO 01/17190 A2

(51) International Patent Classification⁷: H04L 29/00

(21) International Application Number: PCT/US00/22654

(22) International Filing Date: 17 August 2000 (17.08.2000)

(25) Filing Language: English

(26) Publication Language: English

(30) Priority Data:

09/386,099	30 August 1999 (30.08.1999)	US
09/490,313	24 January 2000 (24.01.2000)	US
09/556,254	24 April 2000 (24.04.2000)	US

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(81) Designated States *(national)*: AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, BZ, CA, CH, CN, CU, CZ, DE, DK, DZ, EE, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MD, MG, MK, MN, MW, MX, MZ, NO, NZ, PL, PT, RO, RU, SD, SE, SG, SI, SK, SL, TJ, TM, TR, TT, UA, UG, US, UZ, VN, YU, ZA, ZW.

(84) Designated States *(regional)*: ARIPO patent (GH, GM, KE, LS, MW, MZ, SD, SL, SZ, TZ, UG, ZW), Eurasian patent (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European patent (AT, BE, CH, CY, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE), OAPI patent (BF, BJ, CF, CG, CI, CM, GA, GN, GW, ML, MR, NE, SN, TD, TG).

Published:
— *Without international search report and to be republished upon receipt of that report.*

For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.

WO 01/17190 A2

(54) Title: METHOD AND APPARATUS FOR USING NON-ENGLISH CHARACTERS IN DOMAIN NAMES AND E-MAIL ADDRESSES

(57) Abstract: A method and apparatus for resolving IP (Internet Protocol) addresses for non-English characters in domain names and e-mail addresses. More specifically, information relating to a plurality of non-English character domain names is stored in a non-English character translation web site. A user enters a non-English character domain name at a user terminal. The non-English character domain name is then sent to the non-English character translation web site, which in turn resolves an IP address for the non-English character domain name. Based on the resolved IP address, the user terminal is communicatively connected to a web site or e-mail host.

METHOD AND APPARATUS FOR USING NON-ENGLISH CHARACTERS IN DOMAIN NAMES AND E-MAIL ADDRESSES

Cross Reference

This application is a continuation of applicant's U.S. patent application serial number 09/556,254 filed on April 24, 2000, of applicant's U.S. patent application serial number 09/490,313 filed on January 24, 2000, and of applicant's U.S. patent application serial number 09/386,099 filed on August 30, 1999.

Background of the Invention

The present invention relates to a method and apparatus for resolving domain names and/or e-mail addresses.

Using a web browser running at a user terminal, a user can gain access to a particular web site by entering a domain name assigned to that web site. Likewise, using e-mail application software running at a user terminal, a user can gain access to an e-mail host (or e-mail server) by entering an e-mail address hosted on that e-mail host (or e-mail server). A web site or e-mail host (or e-mail server) is assigned with a unique domain name and an IP (Internet Protocol) address. Conventionally, a domain name consists of one or more letters of the English alphabet; one or more other English keyboard characters such as numerical characters 0-9, "-" (dash), and "." (period), or a combination of English letter(s) and other English keyboard character(s). DNS (Domain Name Service) can resolve English letter domain names into their corresponding IP addresses. Using an IP address that has been assigned to a web site or an e-mail host, a user terminal can be communicatively connected with that web site or e-mail host.

Many people in the world do not use and understand English. Hence, it is difficult for these people to use English letters as domain names or e-mail addresses. For a person who cannot understand English, it is desirable to use domain names or e-mail addresses in his/her own native language. However, at the present time, DNS can only resolve English letter domain names and e-mail addresses, and the Internet protocols are unable to process non-English character commands and data.

There is, therefore, a need for a method and apparatus to enable users to use non-English characters as domain names and as e-mail addresses.

There is another need for a method and apparatus to process non-English character commands and data into a format that is recognizable by Internet protocols.

There is a further need to provide a method and apparatus to enable users to use non-English characters as search phrases to conduct domain name or web site searches.

Th present invention provides such a method and apparatus.

Summary of the Invention

In one aspect, the invention provides a method for processing non-English character domain names. The method comprises the steps of: receiving a non-English character domain name that is assigned to a web site at a user terminal; resolving an IP address for the non-English character domain name; and connecting the user terminal to the web site according to the resolved IP address.

In another aspect, the invention provides a method for processing non-English character domain names in a non-English character translation web site. The method comprises the steps of: storing information relating to a plurality of non-English character domain names in the non-English character translation web site; receiving a non-English character domain name that is assigned to a web site at the non-English character translation web site from a user terminal; and resolving an IP address for the non-English character domain name at the non-English character translation web site.

In still another aspect, the invention provides a method for processing non-English character domain names. The method comprises the steps of: receiving a non-English character domain name; mapping the non-English character domain name into an English letter domain name; sending the English letter domain name to DNS; and resolving an IP address for the English letter domain name by the DNS.

With this invention, users can use non-English character domain names to gain access to web sites, and use non-English character e-mail addresses to e-mail hosts.

The present invention also provides a corresponding apparatus for performing the steps described in the methods above described.

Brief Description of the Drawings

The purpose and advantages of the present invention will be apparent to those skilled in the art from the following detailed description in conjunction with the appended drawing, in which:

Figure 1 shows a network system 100, including a non-English character translation web site, in accordance with the present invention;

Figure 2 shows some of the software components in the non-English character translation web site 104 shown in Figure 1, in accordance with the present invention;

Figure 3 shows some of the software components in a user terminal shown in Figure 1, in accordance with the present invention;

Figure 4 shows a screen display 400 that includes a plurality of non-English character entrance icons, in accordance with the present invention;

Figure 5A shows a screen display 500A that is displayed in response to a selection of the icon 402A in Figure 4, in accordance with the present invention;

Figure 5B shows a screen display 500B that is displayed in response to a selection of the icon 402B in Figure 4, in accordance with the present invention;

Figure 5C shows a screen display 500C that is displayed in response to a selection of the icon 402C in Figure 4, in accordance with the present invention;

Figure 5D shows a screen display 500D that is displayed in response to a selection of the icon 402D in Figure 4, in accordance with the present invention;

Figure 5x shows a screen display 500x that is displayed in response to a selection of the icon 402x in Figure 4, in accordance with the present invention;

Figure 6A shows a screen display 600A that is displayed in response to a selection of the link region 502A in Figure 5A, in accordance with the present invention;

Figure 6B shows a screen display 600B that is displayed in response to a selection of the link region 502B in Figure 5B, in accordance with the present invention;

Figure 6C shows a screen display 600C that is displayed in response to a selection of the link region 502C in Figure 5C, in accordance with the present invention;

Figure 6D shows a screen display 600D that is displayed in response to a selection of the link region 502D in Figure 5D, in accordance with the present invention;

Figure 6x shows a screen display 600x that is displayed in response to a selection of the link region 502x in Figure 5x, in accordance with the present invention;

Figure 7A shows a screen display 700A that is displayed in response to a selection of the link region 504A in Figure 5A, in accordance with the present invention;

Figure 7B shows a screen display 700B that is displayed in response to a selection of the link region 504B in Figure 5B, in accordance with the present invention;

Figure 7C shows a screen display 700C that is displayed in response to a selection of the link region 504C in Figure 5C, in accordance with the present invention;

Figure 7D shows a screen display 700D that is displayed in response to a selection of the link region 504D in Figure 5D, in accordance with the present invention;

Figure 7x shows a screen display 700x that is displayed in response to a selection of the link region 504x in Figure 5x, in accordance with the present invention;

Figure 8A shows a screen display 800A that is displayed in response to a selection of the button 702A in Figure 7A, in accordance with the present invention;

Figure 8B shows a screen display 800B that is displayed in response to a selection of the button 702B in Figure 7B, in accordance with the present invention;

Figure 8C shows a screen display 800C that is displayed in response to a selection of the button 702C in Figure 7C, in accordance with the present invention;

Figure 8D shows a screen display 800D that is displayed in response to a selection of the button 702D in Figure 7D, in accordance with the present invention;

Figure 8x shows a screen display 800x that is displayed in response to a selection of the button 702x in Figure 7x, in accordance with the present invention;

Figure 9A shows a screen display 900A that is displayed in response to a selection of the link region 506A in Figure 5A, in accordance with the present invention;

Figure 9B shows a screen display 900B that is displayed in response to a selection of the link region 506B in Figure 5B, in accordance with the present invention;

Figure 9C shows a screen display 900C that is displayed in response to a selection of the link region 506C in Figure 5C, in accordance with the present invention;

Figure 9D shows a screen display 900D that is displayed in response to a selection of the link region 506D in Figure 5D, in accordance with the present invention;

Figure 9x shows a screen display 900x that is displayed in response to a selection of the link region 506x in Figure 5x, in accordance with the present invention;

Figure 10 shows a flowchart illustrating a process of converting a non-English character domain name to a domain IP address, in accordance with one embodiment of the present invention;

Figure 11 shows a flowchart illustrating a process of converting a non-English character domain name to a domain IP address, in accordance with another embodiment of the present invention;

Figure 12 shows a flowchart illustrating a process of converting a non-English character domain name to a domain IP address, in accordance with still another embodiment of the present invention;

Figure 13 shows a flowchart illustrating a process of converting a non-English character e-mail address to an e-mail host IP address, in accordance with the present invention;

Figure 14 shows a flowchart illustrating a process of performing a domain name or web site search using a non-English search phrase, in accordance with the present invention; and

Figure 15 shows a block diagram of a computer system 1500, which can be used as a hardware platform for a user terminal (106.1, 106.2, ..., or 106.n) or a computer server 200, in accordance with the present invention.

Detailed Description of the Embodiments

The following description is presented to enable any person skilled in the art to make and use the invention, and is provided in the context of a particular application and its requirements.

Figure 1 shows a network system 100, in accordance with the present invention.

The network system 100 includes a network 102 (i.e. a wide area network WAN, the Internet, or an Intranet), a plurality of e-mail hosts (103.1, 103.2, ..., 103k), a non-English character translation web site 104, a plurality of web sites (105.1, 105.2, ..., 105.m), a plurality of user terminals (106.1, 106.2, ..., 106.n), and a plurality of ISPs (Internet Service Providers) (118.2, ..., 118.n). The e-mail hosts (103.1, 103.2, ..., 103.k), the non-English character translation web site 104, and the web sites (105.1, 105.2, ..., 105.m) are coupled to the network 102. A user terminal can gain access to the network 102 by either using a local server via a digital line (such as the user terminal 106.1), or by using an ISP via an analog line (such as the user terminal 106.2). A user terminal has a unique IP address at the time when it gains access to the network 102.

Each of the user terminals includes a display (108.1, 108.2, ..., or 108.n), a desk top (or tower) cabin (110.1, 110.2, ..., or 110.n), a mouse (114.1, 114.2, ..., or 114.n), and an English keyboard (116.1, 116.2, ..., or 116.n). Installed in each of the user terminals (106.1, 106.2, ..., or 106.n) are a browser (111.1, 111.2, ..., or 111.n), and an e-mail application software (113.1, 113.2, ..., or 113.n).

Figure 2 shows some software components installed in a server computer system 200 for hosting the non-English character translation web site 104, in accordance with the present invention.

As shown in Figure 2, the server computer system 200 contains some of the software components, including a non-English character-processing program 202, an e-mail server software 204, a web server software 206, a non-English character domain name database 208, an English letter domain name database 210, a domain name IP address database 211, a non-English character domain name information database 212, a non-English character e-mail host domain name database 214, an English letter e-mail host address database 216, and an e-mail host IP address database 217.

The non-English character-processing program 202 communicates with the e-mail server software 204 and the web server software 206, and is able to recognize and interpret non-English character inputs. The English letter domain name database 210 stores a plurality of English letter domain names. The domain name IP addresses database 211 stores a plurality of domain name IP addresses. The non-English character domain name database 208 contains a plurality of non-English character domain names (i.e. Chinese, Japanese, Korean, Greek, Russian, Arabic, Hebrew, or any other non-English character languages). A non-English character domain name may also include one or more other English keyboard characters, such as numerical characters 0-9, "-" (dash), and "." (period). The non-English character domain name database 208 also contains a first index table 222 for mapping each of the non-English character domain names with a corresponding English letter domain name in the English letter domain name database 210. The non-English character domain name database 208 further contains a second index table 224 for mapping each of the non-English character domain names with a corresponding domain name IP address in the domain name IP address database 211. The non-English character domain name information database 212 contains the information for the non-English domain names stored in the non-English character domain name database 208. The e-mail server software 204 is able to process the e-mail service requests, and the web server software 206 is able to process the web service requests.

The non-English character-processing program 202 can gain access to, and retrieve data from, all other software components (including 208, 210, 211, 212, 214, 216, 217, 222, 224, 226, and 228).

Figure 3 shows some of the software components that are installed in a user terminal (106.1, 106.2, ..., or 106.n), in accordance with the present invention.

As shown in Figure 3, the user terminal contains a browser (111.1, 111.2, ..., or 111.n), an e-mail application software (113.1, 113.2, ..., or 113.n), a non-English character domain name database 308, an English letter domain name database 310, a domain name IP address database 311, a non-English character domain name information database 312, a non-English character e-mail host domain name database 314, an English letter e-mail host address database 316, an e-mail address IP address database 317, and an address resolver 319.

The browser (111.1, 111.2, ..., or 111.n) is able to send web service requests to web sites that are coupled to the network 102, and displays web pages that are received from the web sites. The e-mail application software (113.1, 113.2, ..., or 113.n) is able to send e-mail service requests to, and receive e-mails from, e-mail servers (or e-mail hosts). The English letter domain name database 310 stores a plurality of English letter domain names. The domain name IP address database 311 stores domain name IP addresses. The non-English character domain name database 308 contains a plurality of non-English character domain names (i.e. in Chinese, Japanese, Korean, Greek, Russian, Arabic, Hebrew, or any other non-English character languages). A non-English character domain name may include one or more other English keyboard characters, such as numerical characters 0-9, "-" (dash), and "." (period). The non-English character domain name database 308 also contains a first index table 322 for mapping each of the non-English character domain names with a corresponding English letter domain name in the English letter domain name database 310. The non-English character domain name database 308 further contains a second index table 324 for mapping each of the non-English character domain names with a corresponding domain name IP address in the domain name IP address database 311. The non-English character domain name information database 312 contains the information for the non-English character domains stored in the non-English character domain name database 308. The address resolver 319 is able to resolve IP addresses and passes the resolved IP addresses to the browser or e-mail application software.

The browser (111.1, 111.2, ..., or 111.n) can gain access to, and retrieve information and data from, the software components 308, 310, 311, 312, 322, and 324. The e-mail application software (113.1, 113.2, ..., or 113.n) can gain access to, and retrieve information and data from, the software components 314, 316, 317, 326, and 328. The browser or e-mail application software contains a program that is able to recognize and interpret non-English character inputs.

Figure 4 shows a screen display (or graphic user interface) 400 that is displayed on one of the user terminals (106.1, 106.2, ..., or 106.n), in accordance with the present invention.

As shown in Figure 4, the screen display 400 contains a plurality of icons (402A, 402B, ..., 402J, ...). For example, the icon 402.A contains "Chinese Language Web Site Entrance" in Chinese, the icon 402.B contains "Japanese

Language Web Site Entrance" in Japanese, the icon 402.C contains "Korean Language Web Site Entrance" in Korean, and the icon 402.D contains "Russian Language Web Site Entrance" in Russian. In response to a selection (or clicking) of an icon (402.A, 402.B, 402.C, and 402.D), the screen display 400 will be replaced by a subsequent screen display (500A, 500B, 500C, or 500D).

Figure 5A shows a screen display (graphic user interface) 500A that is displayed in response to a selection of the icon 402A in Figure 4, in accordance with the present invention.

As shown in Figure 5A, the screen display 500A contains a "Chinese character e-mail" link region 502A, a "Chinese character web sites" link region 504A, and a "Chinese character web site search" link region 506A. In response to a selection of the link region 502A, the screen display 500A is replaced by the screen display 600A. In response to a selection of the link region 504A, the screen display 500A is replaced by the screen display 700A. In response to a selection of the link region 506A, the screen display 500A is replaced by the screen display 900A.

Figure 5B shows a screen display (graphic user interface) 500B that is displayed in response to a selection of the icon 402B in Figure 4, in accordance with the present invention.

As shown in Figure 5B, the screen display 500B contains a "Japanese character e-mail" link region 502B, a "Japanese character web sites" link region 504B, and a "Japanese character web site search" link region 506B. In response to a selection of the link region 502B, the screen display 500B is replaced by the screen display 600B. In response to a selection of the link region 504B, the screen display 500B is replaced by the screen display 700B. In response to a selection of the link region 506B, the screen display 500B is replaced by the screen display 900B.

Figure 5C shows a screen display (graphic user interface) 500C that is displayed in response to a selection of the icon 402C in Figure 4, in accordance with the present invention.

As shown in Figure 5C, the screen display 500C contains a "Korean character e-mail" link region 502C, a "Korean character web sites" link region 504C, and a "Korean character web site search" link region 506C. In response to a selection of the link region 502C, the screen display 500C is replaced by the screen display 600C. In response to a selection of the link region 504C, the screen display 500C is replaced by the screen display 700C. In response to a selection of the link region 506C, the screen display 500C is replaced by the screen display 900C.

Figure 5D shows a screen display (graphic user interface) 500D that is displayed in response to a selection of the icon 402D in Figure 4, in accordance with the present invention.

As shown in Figure 5D, the screen display 500C contains a "Russian character e-mail" link region 502D, a "Russian character web sites" link region 504D, and a "Russian character web site search" link region 506D. In response to a sel ction of the link region 502D, the screen display 500D is replaced by the screen display 600D. In response to a selection of the link region 504D, the screen display 500D is replaced by the screen display 700D. In response to a selection of the link region 506D, the screen display 500D is replaced by the screen display 900D.

Figure 5x shows a screen display (graphic user interface) 500x that is displayed in response to a selection of the icon 402x in Figure 4 (note: x can be an English alphabet of A, B, ..., or J, ...), in accordance with the present invention.

As shown in Figure 5x, the screen display 500x contains a "Non-English character e-mail" link region 502x in a non-English character language, a "non-English character web sites" link region 504x in a non-English character language, and a "non-English character web site search" link region 506x in a non-English character language. In response to a selection of the link region 502x, the screen display 500x is replaced by the screen display 600x. In response to a selection of the link region 504x, the screen display 500x is replaced by the screen display 700x. In response to a selection of the link region 506x, the screen display 500x is replaced by the screen display 900x.

Figure 6A shows a screen display (or graphic user interface) 600A that is displayed on a user terminal (106.1, 106.2, ..., or 106.n) in response to a selection of the link region 502A (see Figure 5A) at a user terminal, in accordance with the present invention.

As shown in Figure 6A, the screen display 600A contains a display region 602A showing "Receiver" in Chinese, a link region 603A showing the receiver's e-mail address ("Zhang Feng, the Second Medical University, Shanghai") in Chinese, a display region 604A showing "Sender" in Chinese, a link region 605A showing the sender's e-mail address ("Wang Min, the First Foreign-Language University, Beijing") in Chinese, a display region 606A showing "E-mail Contents" in Chinese, a display region 608A showing the e-mail contents in Chinese that are entered from the user terminal, a "Send" (in Chinese) button 610A, and a "Reply" (in Chinese) button 612A. The sender's e-mail address contains an e-mail host domain name (i.e. the Second Medical University, Shanghai). The receiver's e-mail address also contains an e-mail host domain name (i.e. the First Foreign-Language University, Beijing). A Chinese character can be entered into a computer system according to its "Han Yu Pin Ying" (or the phonetic transcription of Chinese character) by using English alphabet a-z and/or A-Z on an English keyboard (116.1, 116.2, ..., or 116.n) as shown in Figure 1. Thus, using an English keyboard, a user can enter a Chinese character e-mail address into the link region 603A or 605A, and compose Chinese e-mail contents in the display region 608A.

Figure 6B shows a screen display (or graphic user interface) 600B that is displayed in response to a selection of the link region 502B (see Figure 5B) at a user terminal, in accordance with the present invention.

As shown in Figure 6B, the screen display 600B contains a display region 602B showing "Receiver" in Japanese, a link region 603B showing the receiver's e-mail address in Japanese, a display region 604B showing "Sender" in Japanese, a link region 605B showing the sender's e-mail address in Japanese, a display region 606B showing "E-mail Contents" in Japanese, a display region 608B for containing the e-mail contents that are entered in Japanese by a user, a "Send" (in Japanese) button 610B, a "Reply" (in Japanese) button 612B, and a keyboard 614B containing Japanese character components. By selecting (or clicking) the Japanese character components from the keyboard 614B, a user can enter a Japanese character e-mail address into the link region 603B or 605B, and compose Japanese e-mail contents in the display region 608B. The receiver or sender's e-mail address in the link region 603B or 605B contains an e-mail host domain name in Japanese.

Figure 6C shows a screen display (or graphic user interface) 600C that is displayed in response to a selection of the link region 502C (see Figure 5C) at a user terminal, in accordance with the present invention.

As shown in Figure 6C, the screen display 600C contains a display region 602C showing "Receiver" in Korean, a link region 603C showing the receiver's e-mail address in Korean, a display region 604C showing "Sender" in Korean, a link region 605C showing the sender's e-mail address in Korean, a display region 606C showing "E-mail Contents" in Korean, a display region 608C for containing the e-mail contents that are entered in Korean from the user terminal, a "Send" (in Korean) button 610C, a "Reply" (in Korean) button 612C, and a keyboard containing Korean components. By selecting (or clicking) the Korean components from the keyboard 614C, a user can enter a Korean character e-mail address into the link region 603C or 605C, and compose Korean e-mail contents in the display region 608C. The sender or receiver's e-mail address in the link region 603C or 605C contains an e-mail host domain name in Korean.

Figure 6D shows a screen display (or graphic user interface) 600D that is displayed in response to a selection of the link region 502D (see Figure 5D) at a user terminal, in accordance with the present invention.

As shown in Figure 6D, the screen display 600D contains a display region 602D showing "Receiver" in Russian, a link region 603D showing the receiver's e-mail address in Russian, a display region 604D showing "Sender" in Russian, a link region 605D showing the sender's e-mail address in Russian, a display region 606D showing "E-mail Contents" in Russian, a display region 608D for containing the e-mail contents that are ent red in Russian from the user terminal, a "Send" (in Russian) button 610D, a "Reply" (in Russian) button 612D, and a keyboard containing Russian components. By selecting (or clicking) the Russian components from the keyboard 614D, a user can enter a Russian character e-mail address into the link region 603D or 605D, and compose Russian e-mail contents in the display region 608D. The sender or receiver's e-mail address in the link region 603D or 605D contains an e-mail host domain name in Russian.

Figure 6x shows a screen display (or graphic user interface) 600x (note: x can be an English alphabet A, B, ..., or J, ...) that is displayed in response to a selection of the link region 502x at a user terminal, in accordance with the present invention.

As shown in Figure 6x, the screen display 600x contains a display region 602x showing "Receiver" in a non-English character language, a link region 603x showing the receiver's e-mail address "xxxxxx" (a fictitious e-mail address) in a non-English character language, a display region 604x showing " Sender" in a non-English character language, a link region 605x showing the sender's e-mail address "xxxxxx" (a fictitious e-mail name) in a non-English character language, a display region 606x showing "E-mail Contents" in a non-English character language, a display region 608x for containing the e-mail contents that are entered in a non-English character language by a user, a "Send" (in a non-English character language) button 610x, a "Reply" (in a non-English character language) button 612x, and a keyboard 614x containing a non-English character components. By selecting (or clicking) the non-English character components from the keyboard 612x, a user can enter a non-English character e-mail address into the link region 603x or 605x, and compose non-English character e-mail contents into the display region 608x. The receiver or sender's e-mail address in the link region 603x or 605x contains an e-mail host domain name in a non-English character language.

Figure 7A shows a screen display (graphic user interface) 700A that is displayed in response to a selection of the link region 504A (see Figure 5A) at a user terminal, in accordance with the present invention.

As shown in Figure 7A, the screen display 700A contains a plurality of web site category link regions, including a "Department Store" (in Chinese) link region 702A, a "Travel" (in Chinese) link region 704A, a "Sport" (in Chinese) link region 706A, and a "Weather" (in Chinese) link region 708A. In response to a selection of one of the category link regions, a drill-down list that contains a list of domain names in Chinese relating to the selected category will be displayed. For example, in response to a selection of the "Department Store" (in Chinese) link region 702A, the screen display 700A will be replaced by the screen display 800A, which contains a Chinese drill-down list showing a plurality of department store domain names.

Figure 8A shows a screen display 800A that is displayed in response to a selection of the region 702A (see Figure 7) at a user terminal, in accordance with the present invention.

As shown in Figure 8A, the screen display 800A contains a plurality of link regions in Chinese indicating the domain names assigned to a plurality of web sites, including a "First Department Store" (in Chinese) link region 802A, a

"Second Department Store" (in Chinese) link region 804A, and a "Third Department Store" (in Chinese) link region 806A. The screen display 800A also contains a displaying region 808A showing prompt "Please enter the name of a web site" in Chinese, a data region 810A for allowing a user to enter a Chinese domain name using an English keyboard (116.1, 116.2, ..., or 116.n), and a "Submit" button 812A.

Figure 7B shows a screen display (graphic user interface) 700B that is displayed in response to a selection of the link region 504B (see Figure 5B) at a user terminal, in accordance with the present invention.

As shown in Figure 7B, the screen display 700B contains a plurality of web site category link regions, including a "Department Store" (in Japanese) link region 702B, a "Travel" (in Japanese) link region 704B, a "Sport" (in Japanese) link region 706B, and a "Weather" (in Japanese) link region 708B. In response to a selection of one of the category link regions, a drill-down list that contains a list of Japanese domain names relating to the selected category will be displayed. For example, in response to a selection of the "Department Store" (in Japanese) link region 702B, the screen display 700B will be replaced by the screen display 800B.

Figure 8B shows a screen display 800B that is displayed in response to a selection of the link region 702B (see Figure 7B) at a user terminal, in accordance with the present invention.

As shown in Figure 8B, the screen display 800B contains a plurality of Japanese link regions indicating the domains assigned to a plurality of web sites, including a link region 802B showing "First Department Store" (a fictitious department store name) in Japanese, a link region 804B showing "Second Department Store" (a fictitious department store name) in Japanese, and a link region 806B showing "Third Department Store" (a fictitious department store name) in Japanese. The screen display 800B also contains a displaying region 808B showing prompt "Please enter the name of a web site" in Japanese, a data region 810B for allowing a user to enter a Japanese domain name using the keyboard 814B, and a "Submit" button 812B.

Figure 7C shows a screen display (graphic user interface) 700C that is displayed in response to a selection of the link region 504C (see Figure 5C) at a user terminal, in accordance with the present invention.

As shown in Figure 7C, the screen display 700C contains a plurality of web site category link regions, including a "Department Store" (in Korean) link region 702C, a "Travel" (in Korean) link region 704C, a "Sport" (in Korean) link region 706C, and a "Weather" (in Korean) link region 708C. In response to a selection of one of the category link regions, a drill-down list that contains a list of Korean domain names relating to the selected category will be displayed. For example, in response to a selection of th "Department Store" (in Korean) link region 702C, the screen display 700C will be replaced by the screen display 800C.

Figure 8C shows a screen display 800C that is displayed in response to a selection of the link region 702C, in accordance with the present invention.

As shown in Figure 8C, the screen display 800C contains a plurality of Korean link regions indicating the domains assigned to a plurality of web sites, including a link region 802C showing "First Department Store" (a fictitious department store name) in Korean, a link region 804C showing "Second Department Store" (a fictitious department store name) in Korean, and a link region 806C showing "Third Department Store" (a fictitious department store name) in Korean. The screen display 800C also contains a displaying region 808C showing prompt "Please enter the name of a web site" in Korean, a data region 810C for allowing a user to enter a Korean domain name using the keyboard 814C, and a "Submit" button 812C.

Figure 7D shows a screen display (graphic user interface) 700C that is displayed in response to a selection of the link region 504D (see Figure 5D) at a user terminal, in accordance with the present invention.

As shown in Figure 7D, the screen display 700D contains a plurality of web site category link regions, including a "Department Store" (in Russian) link region 702C, a "Travel" (in Russian) link region 704C, a "Sport" (in Russian) link region 706C, and a "Weather" (in Russian) link region 708C. In response to a selection of one of the category link regions, a drill-down list that contains a list of Russian domain names relating to the selected category will be displayed. For example, in response to a selection of the "Department Store" (in Russian) link region 702D, the screen display 700D will be replaced by the screen display 800D.

Figure 8D shows a screen display 800D that is displayed in response to a selection of the link region 702D, in accordance with the present invention.

As shown in Figure 8D, the screen display 800D contains a plurality of Russian link regions indicating the domains assigned to a plurality of web sites, including a link region 802D showing "First Department Store" (a fictitious department store name) in Russian, a link region 804D showing "Second Department Store" (a fictitious department store name) in Russian, and a link region 806D showing "Third Department Store" (a fictitious department store name) in Russian. The screen display 800D also contains a displaying region 808D showing prompt "Please enter the name of a web site" in Russian, a data region 810D for allowing a user to enter a Russian domain name using the keyboard 814D, and a "Submit" button 812D.

Figure 7x shows a screen display (graphic user interface) 700x (note: x can be an English alphabet of A, B, ..., J, ...) that is displayed in response to a selection of the link region 504x (see Figure 5x) at a user terminal, in accordance with the present invention.

As shown in Figure 7x, the screen display 700x contains a plurality of web site category link regions, including a "Department Store" (in a non-English character language) link region 702x, a "Travel" (in a non-English character language) link region 704x, a "Sport" (in a non-English character language) link region 706x, and a "Weather" (in a non-English character language) link region 708C. In response to a selection of one of the category link regions, a drill-down list that contains a list of domain names (in a non-English character language) relating to the selected category will be displayed. For example, in response to a selection of the "Department Store" link region 702x, the screen display 700x will be replaced by the screen display 800x.

Figure 8x shows a screen display 800x that is displayed in response to a selection of the link region 702x, in accordance with the present invention.

As shown in Figure 8x, the screen display 800x contains a plurality of non-English language link regions indicating the domains assigned to a plurality of web sites, including a link region 802x showing "xxxxxx" (i.e. "the First Department Store", a fictitious department store name in a non-English character language), a link region 804x showing "xxxxxx" (i.e. "the Second Department Store", a fictitious department store name in a non-English character language), and a link region 806x showing "xxxxxx" (i.e. the Third Department Store, a fictitious department store name in a non-English character language). The screen display 800x also contains a displaying region 808x showing prompt "Please enter the name of a web site" in a non-English language, a data region 810x for allowing a user to enter a domain name in a non-English character language using the keyboard 814x, and a "Submit" button 812x.

Figure 9A shows a screen display (graphic user interface) 900A that is displayed in response to a selection of the link region 506A in Figure 5A, in accordance with the present invention.

As shown in Figure 9A, the screen display 900A contains a display region 902A showing "Enter Web Site Search Phrase" in Chinese, a data region 904A for allowing a user to enter web site search phrase in Chinese, and a "Search" (in Chinese) button 906A. Using an English keyboard on a user terminal, a user can enter a web site search phrase into the data region 904A. In Figure 9A, the data region 904A contains a search phrase "Women's Cosmetics" in Chinese. In response to a selection of the "Search" button 906A, a service request together with the Chinese search phrase is sent to the non-English character-processing program 202.

Figure 9B shows a screen display (graphic user interface) 900B that is displayed in response to a selection of the link region 506B in Figure 5B, in accordance with the present invention.

As shown in Figure 9B, the screen display 900B contains a display region 902B showing "Enter Web Site Search Phrase" in Japanese, a data region 904B for allowing a user to enter web site search phrase in Japanese, a "Search" (in Japanese) button 906B, and a keyboard 908B containing Japanese character components. By selecting (or clicking) the Japanese character components from the keyboard 908B, a user can enter a search phrase in Japanese into the data region 904B. In response to a selection of the "Search" button 906B, a service request together with the Japanese search phrase is sent to the non-English character-processing program 202.

Figure 9C shows a screen display (graphic user interface) 900C that is displayed in response to a selection of the link region 506C in Figure 5C, in accordance with the present invention.

As shown in Figure 9C, the screen display 900C contains a display region 902C showing "Enter Web Site Search Phrase" in Korean, a data region 904C for allowing a user to enter web site search phrase in Korean, a "Search" (in Korean) button 906C, and a keyboard 908C containing Korean character components. By selecting (or clicking) the Korean character components from the keyboard 908C, a user can enter a search phrase in Korean into the data region 904C. In response to a selection of the "Search" button 906C, a service request together with the Korean search phrase is sent to the non-English character-processing program 202.

Figure 9x shows a screen display (graphic user interface) 900x (note: x can be an English alphabet A, B, ..., J, ...) that is displayed in response to a selection of the link region 506x in Figure 5x, in accordance with the present invention.

As shown in Figure 9x, the screen display 900x contains a display region 902x showing "Enter Web Site Search Phrase" in a non-English character language, a data region 904x for allowing a user to enter web site search phrase in a non-English character language, a "Search" (in a non-English character language) button 906x, and a keyboard 908x containing a non-English character language components. By selecting (or clicking) the non-English character language components from the keyboard 908x, a user can enter a search phrase in a non-English character language into the data region 904x. In response to a selection of the "Search" button 906x, a service request together with a search phrase in a non-English character language is sent to the non-English character-processing program 202.

Figure 10 shows a flowchart illustrating a process of converting a non-English character domain name into a domain name IP address, in accordance with one embodiment of the present invention. In describing the process in Figure 10, it is assumed that a user uses a mouse (114.1, 114.2, ..., or 114.n) at a user terminal (106.1, 106.2, ..., or 106.n) to select (or click) selectable items on the graphic user interfaces shown in Figures 4, 5x, 6x, 7x, 8x and 9x. (Note: x can be an English alphabet of A, B, ..., or J, ...).

Step 1004 stores a plurality of non-English character domain names in the non-English character domain name database 208 or 308.

Step 1006 stores a plurality of English letter domain names in the English letter domain name database 210 or 310, and a plurality of domain name IP addresses in the domain name IP address database 211 or 311.

Step 1008 establishes mapping relationships between the non-English character domain names and their corresponding English letter domain names, and mapping relationships between the non-English character domain names and their corresponding domain name IP addresses. Specifically, two first index tables 222 and 322 are respectively stored in the non-English character domain name databases 208 and 308, through which each of the non-English character domain names in the non-English character domain database 208 or 308 is mapped with a corresponding English letter domain name in the English letter domain name database 210 or 310. In addition, two second index tables 224 and 324 are respectively stored in the non-English character domain name databases 208 and 308, through which each of the non-English character domain names in the non-English character domain database 208 or 308 is mapped with a corresponding domain name IP address in the domain name IP address database 211 or 311.

At step 1010 the user gains access to the non-English character translation web site 104 by selecting an icon 402x at a user terminal (106.1, 106.2, ..., or 106.n). In response, the browser (111.1, 111.2, ..., or 111.n) running at the user terminal sends a web service request containing non-English characters (such as the characters in Chinese, Japanese, Korean, Greek, Russian, Arabic, Hebrew, or any other non-English character languages) to the non-English character-processing program 202 via the network 102. The non-English character-processing program 202 interprets the web service request and sends the interpreted web service request to the web server software 206. In response, the web server software 206 sends a graphic user interface as shown in the screen display 500x to the browser, which in turn displays the screen display 500x on the display (108.1, 108.2, ..., or 108.n) at the user terminal.

To enter a non-English character domain name, the user selects the link region 504x from the screen display 500x. In response, the browser (111.1, 111.2, ..., or 111.n) running at the user terminal sends a web service request containing non-English characters (such as the characters in Chinese, Japanese, Korean, Greek, Russian, Arabic, Hebrew, or any other non-English character languages) to the non-English character-processing program 202 via the network 102. The web service request contains the IP address that is assigned to the user terminal. The non-English character-processing program 202 interprets the web service request and sends the interpreted web service request to the web server software 206. In response, the web server software 206 sends a graphic user interface as shown in the screen display 700x to the browser, which in turn displays the screen display 700x on the display (108.1, 108.2, ..., or 108.n) at the user terminal.

To locate a web site having a particular non-English character domain name, the user selects a link region 702x, 704x, 706x, or 708x from the screen display 700x. For example, when the link region 702x is selected, the display 700x is replaced by the display 800x so that the user can choose a department store displayed on the display 800x. In response, the browser (111.1, 111.2, ..., or 111.n) running at the user terminal sends a web service request containing non-English characters (such as the characters in Chinese, Japanese, Korean, Greek, Russian, Arabic, Hebrew, or any other non-English character languages) to the non-English character-processing program 202 via the network 102. The non-English character-processing program 202 interprets the web service request and sends the interpreted web service request to the web server software 206. In response, the web server software 206 sends a graphic user interface as shown in the screen display 800x to the browser, which in turn displays the screen display 800x on the display (108.1, 108.2, ..., 108.n) at the user terminal.

At step 1012, the user enters a non-English character domain name by selecting one of the three non-English character link regions (802x, 804x or 806x) from the screen display 800x. Or the user enters a non-English character domain name into the region 810x and then selecting the "Submit" button 812x.

At step 1014, in response to a selection of one of the three link regions (802x, 804x, or 806x) or in response to a selection of the "Submit" button 812x, the browser (111.1, 111.2, ..., or 111.n) searches the non-English character domain name contained in the selected link region, or in the display region 810x, from the Non-English character domain name database 308.

At step 1016, the browser determines whether the non-English character domain name can be found. If the non-English character domain name is found, the operation is led to step 1018; if the non-English character domain name cannot be found, the operation is led to the operation shown in Figure 11 or Figure 12.

At step 1018, the browser converts the non-English character domain name into an English letter domain name by mapping the non-English character domain name with a corresponding English letter domain name in the English letter domain name database 310; or the browser resolves the IP address for the non-English character domain name by mapping the non-English character domain name with a corresponding IP address in the domain name IP address database 311. After mapping an English letter domain name for the non-English character domain name, the browser sends the mapped English letter domain name to the address resolver 319. Upon receiving the mapped English letter domain name, the address resolver 319 sends it to DNS, which in turn returns a resolved IP address to the address resolver 319. After receiving the resolved IP address from DNS, the resolver 319 passes the resolved IP address to the browser.

At step 1020, after resolving the IP address by itself or upon receiving the resolved IP address from the address resolver 319, the browser communicatively connects the user terminal with a web site according to the resolved IP address.

Figure 11 shows a flowchart illustrating a process of converting a non-English character domain name into a domain name IP address, in accordance with another embodiment of the present invention.

At step 1104, the browser sends a service request containing the non-English character domain name to the non-English character-processing program 202 via the network 102.

At step 1106, upon receiving the non-English character domain name, the non-English character-processing program 202 converts the non-English character domain name into an English letter domain name by mapping the non-English character domain name with a corresponding English letter domain name in the English domain name database 210; or the non-English character-processing program 202 resolves the non-English character domain name into a domain name IP address by mapping the non-English character domain name with a corresponding domain name IP address in the domain name IP address database 211.

At step 1108, the non-English character-processing program 202 sends the English letter domain name to the browser and address resolver 319, or the non-English character-processing program 202 sends the domain name IP address to the browser, via the network 102. After receiving the English letter domain name, the address resolver 319 sends it to DNS. The DNS in turn resolves an IP address for the English domain name and sends it to the address resolver 319. Upon receiving the resolved IP address from DNS, the address resolver 319 sends it to the browser.

At step 1110, upon receiving the English letter domain name or the domain name IP address, the browser stores the English letter domain name in the English letter domain name database 310, or the domain name IP address in the domain name IP address database 311. The browser also updates the first index table 322 and the second index table 324, to establish mapping relationship between the non-English character domain name and the received English letter domain name and the mapping relationship between the non-English character domain name and the received domain name IP address.

At step 1112, the browser communicatively connects the user terminal with a web site according to the resolved IP address.

Figure 12 shows a flowchart illustrating a process of converting a non-English character domain name into a domain name IP address, in accordance with still another embodiment of the present invention.

At step 1204, the browser sends a web service request containing the non-English character domain name to the non-English character-processing program 202 via the network 102. The web service request also contains the IP address assigned to the user terminal.

At step 1206, upon receiving the non-English character domain name, the non-English character-processing program 202 resolves a domain name IP address for the non-English character domain name by mapping the non-English character domain name with a corresponding domain name IP address in the domain name IP address database 211. The non-English character-processing program 202 then sends the domain name IP address to the web server software 206, and to the browser running at the terminal via the network 102.

At step 1208, the web server software 206 forwards the web service request received from the user terminal to a web site according to the resolved domain name IP address. The web service request contains the IP address of the user terminal.

At step 1210, the web server software in the web site retrieves a page file (such as HTML, SHTML, DHTML, or CGI file), and sends the page file to the user terminal according to the IP address of the user terminal. Upon receiving the page file, the browser at the user terminal displays it on the display on the user terminal. Since the page file contains path link information to the web site, the user terminal is communicatively connected with the web site.

At step 1212, upon receiving the domain name IP address from the non-English character-processing program 202, the browser stores the domain name IP address in the domain name IP address database 311. The browser also updates the second index table 324, to establish mapping relationship between the non-English character domain name and the domain name IP address.

Figure 13 shows a flowchart illustrating a process of converting a non-English character e-mail address to an e-mail host IP address, in accordance with the present invention. In describing the process in Figure 13, it is assumed that a user uses a mouse (114.1, 114.2, ..., or 114.n) at a user terminal (106.1, 106.2, ..., or 106.n) to select (or click) selectable items on the graphic user interfaces shown in the present application. (Note: x can be an English alphabet of A, B, ..., or J, ...).

Step 1304 stores a plurality of non-English character e-mail host domain names in the non-English character e-mail host domain name database 214 or 314.

Step 1306 stores a plurality of English letter e-mail host domain names in the English letter e-mail host domain name database 216 and 316, and a plurality of e-mail host IP addresses in the e-mail host IP address database 217 and 317.

Step1308 establishes mapping relationships between the non-English character e-mail host domain names and the English letter e-mail host domain names. Step 1308 also establishes mapping relationships between the non-English character e-mail host domain names and the e-mail host IP addresses. Specifically, two first index tables 226 and 326 are respectively stored in the non-English character e-mail host domain name database 214 and 314, through which each of the non-English character e-mail host domain names in the non-English character e-mail host domain name database 214 or 314 is mapped with a corresponding English letter e-mail host domain name in the English letter e-mail host domain name database 216 or 316. In addition, two second index tables 228 and 328 are respectively stored in the non-English character e-mail host domain name database 214 and 314, through which each of the non-English character e-mail host domain names in the non-English character e-mail host domain name database 214 or 314 is mapped with a corresponding e-mail host IP address in the e-mail host IP address database 217 or 317.

At step 1310 the user gains access to the non-English character translation web site 104 by selecting an icon 402x at a user terminal (106.1, 106.2, ..., or 106.n). In response, the browser (111.1, 111.2, ..., or 111.n) running at the user terminal sends a web service request containing non-English characters (such as the characters in Chinese, Japanese, Korean, Greek, Russian, Arabic, Hebrew, or any other non-English character languages) to the non-English character-processing program 202 via the network 102. The non-English character-processing program 202 interprets the web service request and sends the interpreted web service request to the web server software 206. In response, the web server software 206 sends a graphic user interface as shown in the screen display 500x to the browser, which in turn displays the screen display 500x on the display (108.1, 108.2, ..., or 108.n) of the user terminal.

To enter a non-English character e-mail address, the user selects a link region 502x from the screen display 500x. In response, the browser (111.1, 111.2, ..., or 111.n) running at the user terminal sends a web service request containing non-English characters (such as the characters in Chinese, Japanese, Korean, Greek, Russian, Arabic, Hebrew, or any other non-English character languages) to the non-English character-processing program 202 via the network 102. The non-English character-processing program 202 interprets the web service request and sends the interpreted service request to the web server software 206. In response, the web server software 206 sends a graphic user interface as shown in the screen display 600x to the browser, which in turn displays the screen display 600x on the display (108.1, 108.2, ..., or 108.n) of the user terminal.

At step 1312, the user enters a non-English character e-mail address to the region 603x or 605x. After composing an e-mail message in the region 608x, the user selects the button 610x or 612x. The non-English character e-mail address contains a non-English character e-mail host domain name.

At step 1314, in response to a selection of the button 610x, the e-mail application software (113.1, 113.2, ..., or 113.n) searches the non-English character e-mail host domain name contained in the non-English character e-mail address from the non-English character e-mail host domain name database 314.

At step 1316, the e-mail application software determines whether the non-English character e-mail host domain name can be found in the non-English character e-mail host domain name database 314. If the non-English character e-mail host domain name can be found, the operation is led to step 1318; if the non-English character e-mail host domain name cannot be found, the operation is led to step 1320.

At step 1318, the e-mail application software converts the non-English character e-mail host domain name into an English letter e-mail host domain name by mapping the non-English character e-mail host domain name with a corresponding English letter e-mail host domain name in the English letter e-mail host domain name database 316; or the e-mail application software resolves the e-mail host IP address for the non-English character e-mail host domain name by mapping the non-English character e-mail host domain name with a corresponding IP address in the e-mail host IP address database 317. After locating the corresponding English letter e-mail host domain name from the English letter e-mail host domain name database 316, the e-mail application software sends it to the address resolver 319. The address resolver 319 then sends the English letter e-mail host domain name to DNS, which in turn returns a resolved IP address that is assigned to an e-mail host on which the non-English character e-mail address is hosted. After receiving the resolved IP address from DNS, the resolver 319 passes the resolved IP address to the e-mail application software. The operation is then led to step 1326.

At step 1320, when the non-English character e-mail domain name cannot be found in the non-English character e-mail host domain name database 314, the e-mail application software sends the non-English character e-mail host domain name to the non-English character-processing program 202 via the network 102.

At step 1322, upon receiving the non-English character e-mail host domain name from the e-mail application software, the non-English character-processing program 202 converts the non-English character e-mail host domain name into English letter e-mail host domain name by mapping the non-English character e-mail host domain name with a corresponding English letter e-mail host domain name in the English letter e-mail host domain name database 316; or the non-English character-processing program 202 resolves the non-English character e-mail host domain name into an e-mail host IP address by mapping the non-English character e-mail host domain name with a corresponding e-mail host IP address in the e-mail host IP address database 317. The non-English character-processing program 202 then sends the English letter e-mail host domain name or the e-mail host IP address to the e-mail application software and the address resolver 319. If the English letter e-mail host domain name is received from the English character-processing program 202, the address resolver 319 sends the English letter e-mail host domain name to DNS, which in turn returns a resolved IP address that is assigned to an e-mail host on which the non-English character e-mail host domain name is hosted. After receiving the resolved IP address from DNS, the resolver 319 passes it to the e-mail application software.

At step 1324, upon receiving the English letter e-mail host domain name or the e-mail host IP address, the e-mail application software stores the English letter e-mail host domain name in the English letter e-mail host domain name database 316, and the e-mail host IP address in the e-mail host IP address database 317. The e-mail application software also updates the first index table 326 and the second index table 328, to establish mapping relationship between the non-English character e-mail host domain name and the received English letter e-mail host domain name, and the mapping relationship between the non-English character e-mail host domain name and the received e-mail host IP address. The operation is then led to step 1326.

At step 1326, the e-mail application software communicatively connects the user terminal to the e-mail host according to the resolved e-mail host IP address. More specifically, in response to a selection of the button 610x, the e-mail application software sends the e-mail message contained in the region 608x to the e-mail address contained in the region 603x according to the resolved e-mail host IP address. In response to a selection of the button 612x, the e-mail application software sends the e-mail message contained in the region 608x to the e-mail address contained in the region 605x according to the resolved e-mail host IP address.

Figure 14 shows a flowchart illustrating a process of performing a web site search using a non-English search phrase, in accordance with the present invention. In describing the process in Figure 14, it is assumed that a user uses a mouse (114.1, 114.2, ..., or 114.n) at a user terminal (106.1, 106.2, ..., or 106.n) to select (or click) selectable items on the graphic user interfaces on the display 9x shown in Figure 9x. (Note: x can be an English alphabet of A, B, ..., or J, ...).

Step 1404 stores a plurality of non-English character domain names in the non-English character domain name database 208 or 308.

Step1406 stores search information in a non-English language in the non-English domain information database 212. The search information contains the search description about the non-English character domain names that are stored in the web site 104.

At step 1408, the user gains access to the non-English character translation web site 104 by selecting an icon 402x at a user terminal (106.1, 106.2, ..., or 106.n). In response, the browser (111.1, 111.2, ..., or 111.n) running at the user terminal sends a web service request containing non-English character (such as the characters in Chinese, Japanese, Korean, Greek, Russian, Arabic, Hebrew, or any other non-English character languages) to the non-English character-processing program 202 via the network 102. The non-English character-processing program 202 interprets the web service request and sends the interpreted web service request to the web server software 206. In response, the web server software 206 sends a graphic user interface as shown in the screen display 500x to the browser, which in turn displays the screen display 500x on the display (108.1, 108.2, ..., or 108.n) of the user terminal.

To conduct a non-English character web site search, the user selects a link region 506x from the screen display 500x. In response, the browser (111.1, 111.2, ..., or 111.n) running at the user terminal sends a web service request containing non-English characters (such as the characters in Chinese, Japanese, Korean, Greek, Russian, Arabic, Hebrew, or any other non-English character languages) to the non-English character-processing program 202 via the Network 102. The non-English character-processing program 202 interprets the web service request and sends the interpreted web service request to the web server software 206. In response, the web server software 206 sends a graphic user interface as shown in the screen display 900x to the browser, which in turn displays the screen display 900x on the display (108.1, 108.2, ..., or 108.n) at the user terminal.

At step 1410, the user enters a non-English search phrase into the region 904x and then selects the button 906x. In response, the browser sends the non-English search phrase to the non-English character-processing program 202 via the network 102.

At step 1412, the non-English character-processing program 202 searches the web sites that potentially satisfy the search phrase based on the information in the non-English domain information database 212, and then passes the searched non-English character domain names to the browser.

At step 1416, the browser displays the non-English character domain names that potentially satisfy the non-English search phrase at the user terminal. By selecting any of the domain names displayed, the user terminal can be communicatively connected to a selected web site.

Figure 15 shows a block diagram of an exemplary computer system 1500, which can be used as a hardware platform for non-English character translation web site 104, a user terminal (106.1, 106.2, ..., 106.n), or an e-mail host (130.1, 130.2, ..., 130.k), in accordance with the present invention.

As shown in Figure 15, the computer system comprises a system bus 1501, a processing unit 1502, a memory device 1504, a hard disk 1506, a disk drive interface 1508, a display monitor 1510 (including a computer screen), a display interface 1512, a bus interface 1514, a mouse 1515, a keyboard 1516, and a network interface 1518.

The hard disk 1506 is coupled to the disk drive interface 1508; the display monitor 1510 is coupled to the display interface 1512; and the mouse 1515 and keyboard 1516 are coupled to the bus interface 1514. Coupled to the system bus 1501 are the processing unit 1502, memory device 1504, disk drive interface 1508, display interface 1512, bus interface 1514, and network interface 1514.

The memory device 1504 is able to store programs (including program codes and data). Operating together with disk drive interface 1508, the hard disk 1506 is also able to store programs. However, the memory device 1504 has faster access speed than the hard disk 1506, while the hard disk 1506 has higher capacity than the memory device 1504.

Operating together with the display interface 1512, the display monitor 1510 is able to provide visual interface between programs being executed and a user.

Operating together with the interface 1514, the mouse 1515 and keyboard 1516 are able to provide inputs to the computer system 1500.

The network interface 1518 provides an interface circuit between the computer system 1500 and the network 102.

The processing unit 1502 has access to the memory device 1504 and the hard disk 1506, and is able to control operations of the computer 1500 by executing programs stored in the memory device 1504 or hard disk 1506. The processing unit 1502 is also able to control the transmissions of programs and data between the memory device 1504 and hard disk 1506.

The software components shown in Figures 2 and 3 can be stored in the memory device 1504 or hard disk 1506. The steps of performing the processes shown in Figures 10-14 can be stored in the memory device 1504 or hard disk 1506, and executed by the processor unit 1502. The graphic user interfaces as shown in Figures 4, 5x, 6x, 7x, 8x, and 9x (note: x can be an English alphabet of A, B, ..., J, ...) can also be stored as HTML, SHTML, SHTML, or CGI files in the memory device 1504 or hard disk 1506.

It should be noted that, to increase response speed, a plurality of non-English character translation web sites can be distributed in many places so that users can get access to a non-English character translation web site that is nearest to them. The service requests from browsers and e-mail application software are exemplary commands that are interpreted by the non-English character processing program.

While the invention has been illustrated and described in detail in the drawing and foregoing description, it should be understood that the invention may be implemented through alternative embodiments within the sprit of the present invention. For example, graphic user interfaces in the embodiments in the present invention are specifically illustrated in non-English character languages including Chinese, Japanese, Korean, Greek, Russian, Arabic, and Hebrew. However, the principle of the present invention applies to any other non-English character languages. Thus, the scope of the invention is not intended to be limited to the illustration and description in this specification, but is to be defined by the appended claims.

What is claimed is:

1. A method for processing non-English character domain names, comprising the steps of:
    (a) receiving a non-English character domain name that is assigned to a web site at a user terminal;
    (b) resolving an IP address for the non-English character domain names; and
    (c) communicatively connecting the user terminal to the web site according to the resolved IP address.

2. A method for processing non-English character domain names in a non-English character translation web site, comprising the steps of:
    (a) storing information relating to a plurality of non-English character domain names in the non-English character translation web site;
    (b) receiving a non-English character domain name that is assigned to a web site from the user terminal;
    (c) sending the non-English character domain name to the non-English character translation web site at the user terminal; and
    (d) resolving an IP address for the non-English character domain name at the non-English character translation web site.

3. The method of claim 3, further comprising the step of:
    communicatively connecting the user terminal to the web site according to the resolved IP address that is assigned to the web site.

4. A method for processing non-English character e-mail address, comprising the steps of:
    (a) receiving a non-English character e-mail address that contains a non-English character e-mail host domain name that is assigned to an e-mail host from a user terminal;
    (b) resolving an IP address that is assigned to the e-mail host; and
    (c) communicatively connecting the user terminal to the e-mail host according to the resolved IP address.

5. A method for processing non-English character e-mail addresses in a non-English character translation web site, comprising the steps of:

    (a) storing in the non-English character translation web site information relating to a plurality of non-English character e-mail host domain names;
    (b) receiving a non-English character e-mail address that contains a non-English character e-mail host domain names for an e-mail host at the non-English character translation web site from a user terminal; and

(c) resolving an IP address for the non-English character e-mail host domain name at the non-English character e-mail translation web site.

6. The method of claim 5, further comprising the step of:
communicatively connecting the user terminal to the e-mail host according to the resolved IP address.

7. A method for searching web sites based on a non-English character search phrase, comprising the steps of:
(a) storing in a non-English character translation web site information relating to a plurality of web sites;
(b) receiving a non-English character search phrase at the non-English character translation terminal from a user terminal; and
(c) searching web sites that satisfy the non-English character search phrase at the non-English character translation web site; and
(d) sending searching result to the user terminal at the non-English character translation web site.

8. A method for resolving non-English character domain names, comprising the steps of:
(a) receiving a non-English character domain name;
(b) mapping the non-English character domain name into an English letter domain name;
(c) sending the English letter domain name to DNS; and
(d) resolving an IP address for the non-English character domain name by the DNS.

9. A method for resolving a non-English character e-mail address, comprising the steps of:
(a) receiving a non-English character e-mail address containing a non-English character e-mail host domain name;
(b) mapping the non-English character e-mail host domain name into an English letter e-mail host domain name;
(c) sending the English letter e-mail host domain name to DNS; and
(d) resolving an IP address for the English e-mail host domain name.

10. A method for processing non-English character domain names in a non-English character translation web site, comprising the steps of:
(a) storing information relating to a plurality of non-English character domain names in the non-English character translation web site;
(b) receiving a service request containing a non-English character domain name that is assigned to a desired web site at the non-English character translation web site from a user terminal;

(c) resolving an IP address for the desired web site at the non-English character translation web site;
(d) forwarding the service request to the web site according to the resolved IP address at the non-English character translation web site; and
(e) sending a page file to the user terminal at the desired web site.

11. A method for using non-English character as domain names, comprising the steps of:
(a) at a user terminal, entering a non-English character domain name that is assigned to a web site; and
(b) connecting the user terminal to the web site according to the non-English character domain name.

12. A method for processing non-English character e-mail address, comprising the steps of:
(a) at a user terminal, entering a non-English character e-mail address that is assigned to an e-mail host from the user terminal; and
(b) sending an e-mail message to the e-mail host according to the non-English character e-mail address.

13. A method for searching web sites based on a non-English character search phrase, comprising the steps of:
(a) entering a non-English character search phrase; and
(b) searching web sites that satisfy the non-English character search phrase.

14. A method for processing non-English character domain names in a non-English character translation web site, comprising the steps of:
(a) storing in the non-English character translation web site a plurality of non-English character domain names that are assigned to a plurality of web sites;
(b) gaining access to the non-English character translation web site by a user;
(c) displaying the plurality of non-English character domain names;
(d) selecting one of the non-English character domain names by a user, the selected non-English character domain name being assigned to a web site; and
(e) resolving the selected non-English domain name into an IP address at the non-English character translation web site.

15. A method for processing non-English character commands and data through a non-English character translation web site, comprising the steps of:
(a) storing in the non-English character translation web site at least one program for processing non-English character commands and data;

(b) receiving a non-English character command or data from a user terminal; and

(c) processing the non-English command or data by the program.

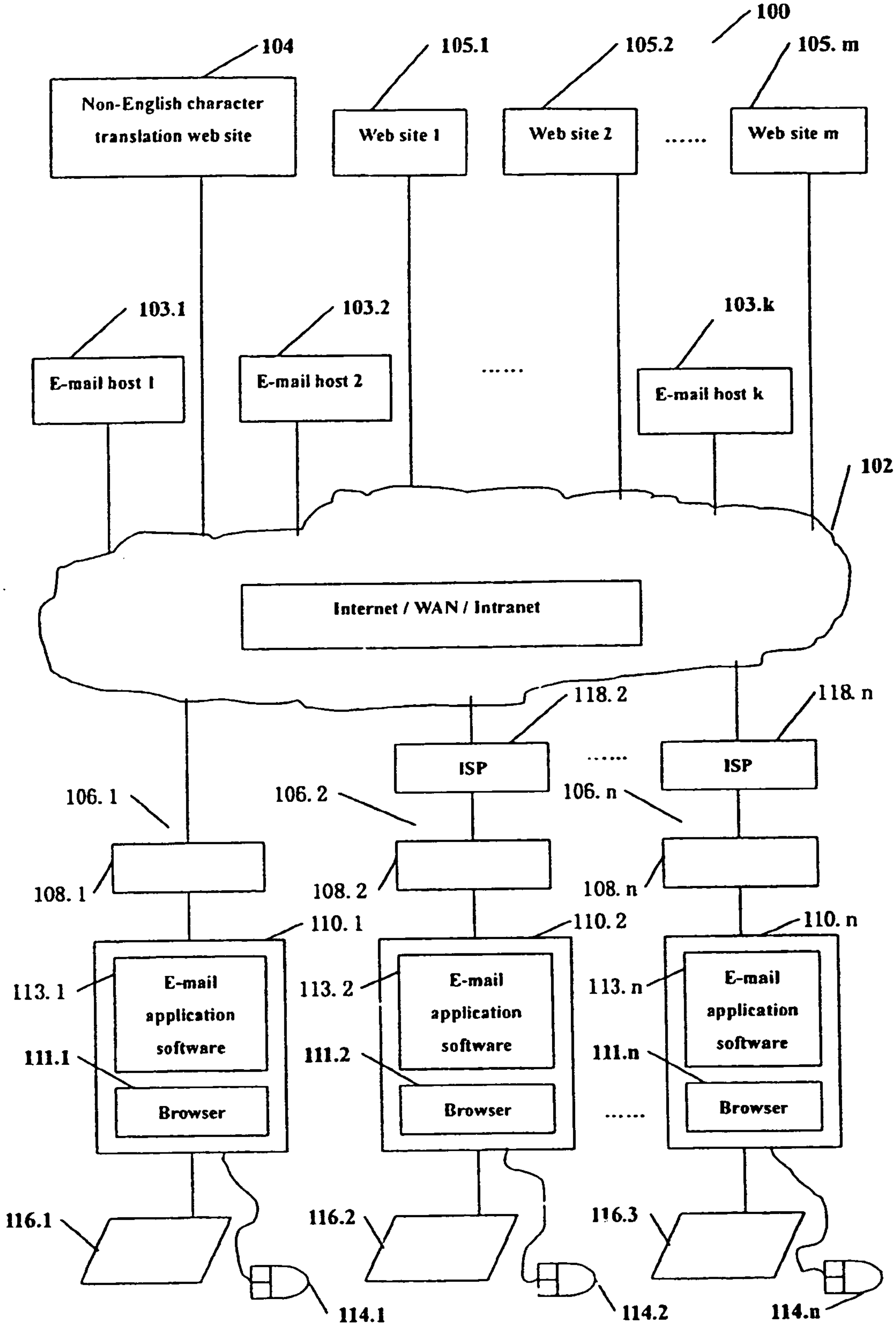

100
104
Non-English character translation web site
105.1
Web site 1
105.2
Web site 2
......
105. m
Web site m
103.1
E-mail host 1
103.2
E-mail host 2
......
103.k
E-mail host k
102
Internet / WAN / Intranet
118. 2
ISP
......
118. n
ISP
106. 1
106. 2
106. n
108. 1
108. 2
108. n
110. 1
110. 2
110. n
113. 1
113. 2
113. n
E-mail application software
E-mail application software
E-mail application software
111.1
111.2
111.n
Browser
Browser
Browser
......
116.1
116.2
116.3
114.1
114.2
114.n

FIG. 1

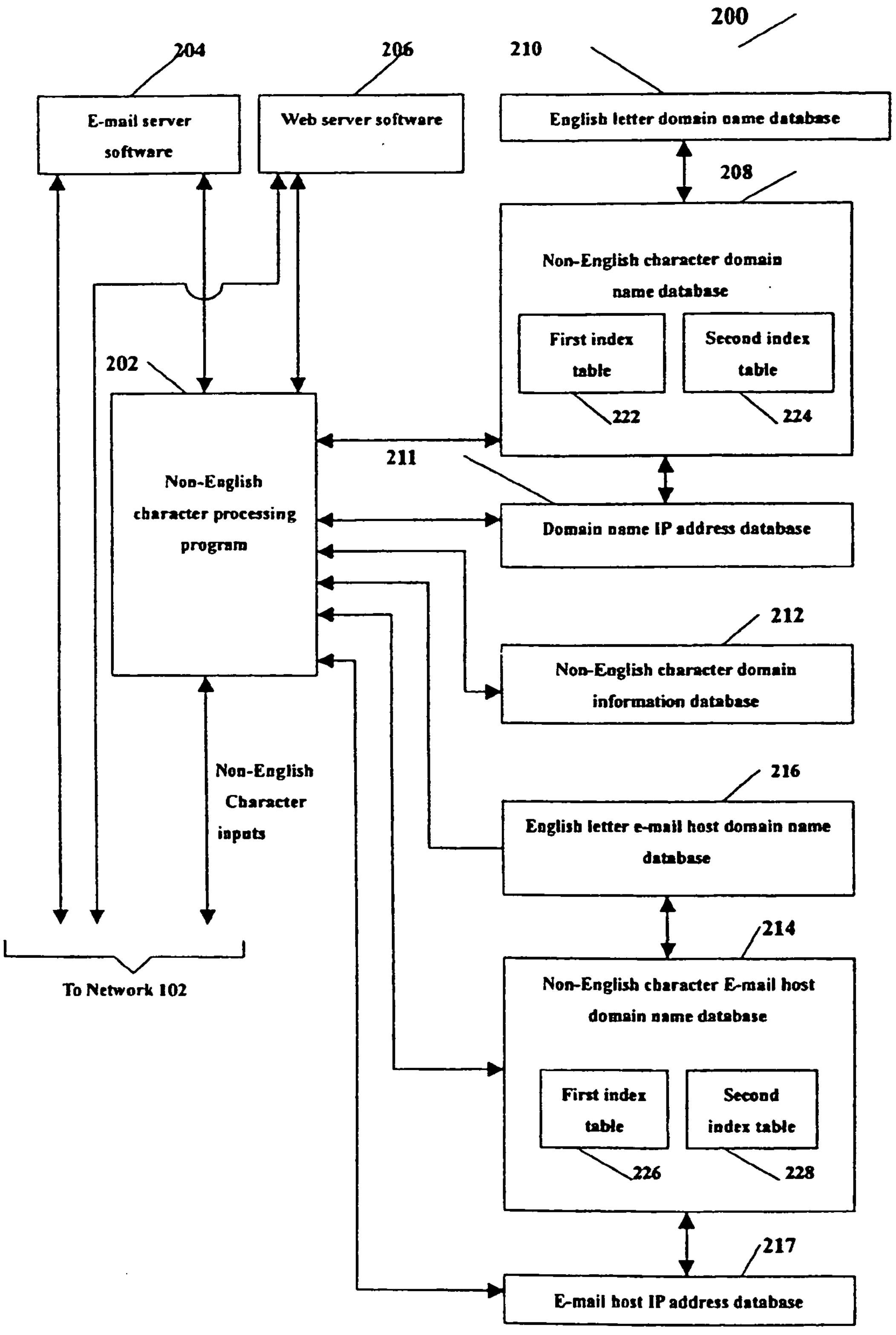

200
204
206
210
E-mail server software
Web server software
English letter domain name database
208
Non-English character domain name database
First index table
Second index table
222
224
202
Non-English character processing program
211
Domain name IP address database
212
Non-English character domain information database
Non-English Character inputs
216
English letter e-mail host domain name database
214
Non-English character E-mail host domain name database
First index table
Second index table
226
228
To Network 102
217
E-mail host IP address database

FIG. 2

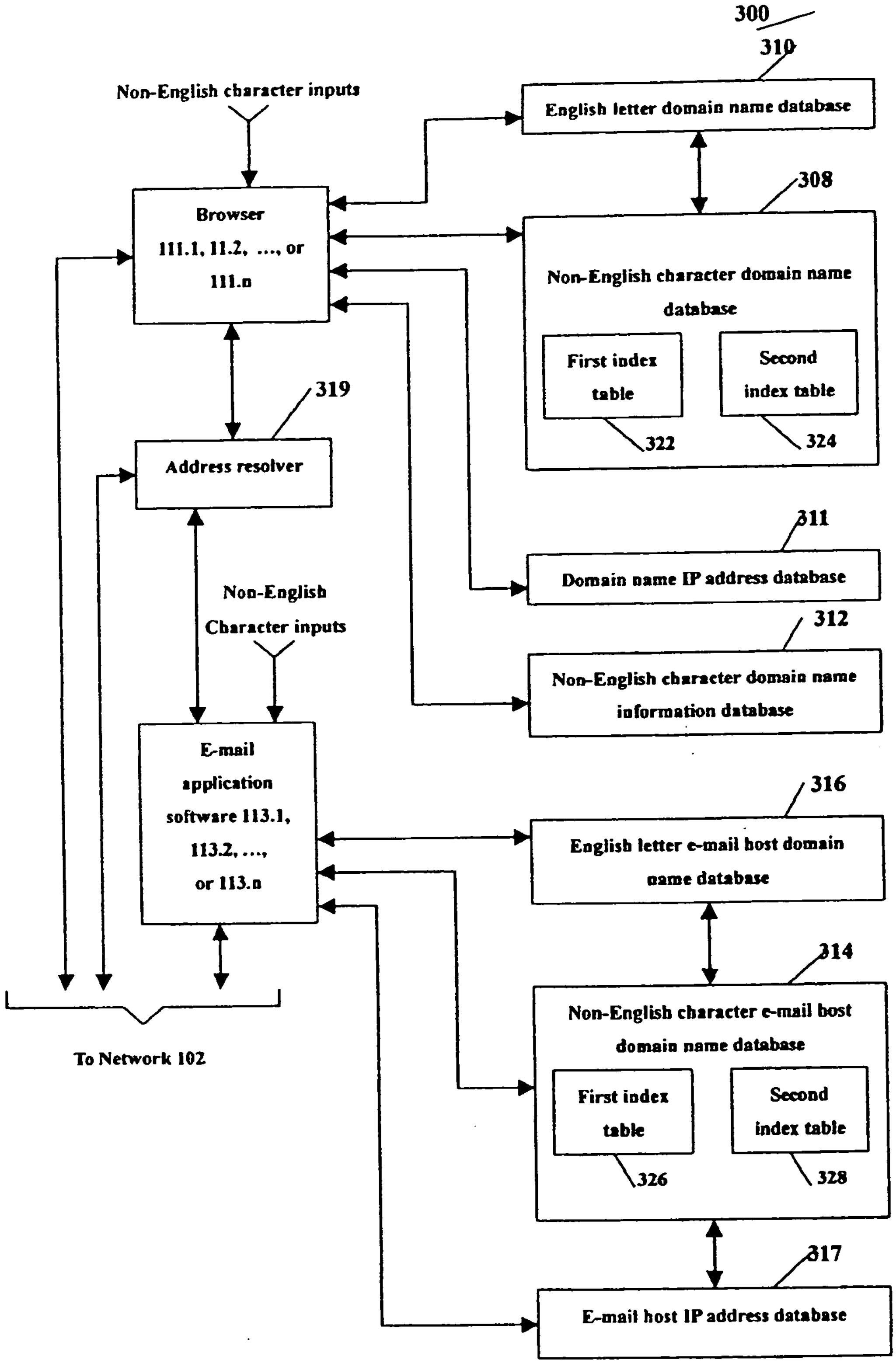

300
310
Non-English character inputs
English letter domain name database
308
Browser
111.1, 11.2, ..., or
111.n
Non-English character domain name database
First index table
Second index table
322
324
319
Address resolver
311
Domain name IP address database
Non-English
Character inputs
312
Non-English character domain name information database
E-mail application software 113.1, 113.2, ..., or 113.n
316
English letter e-mail host domain name database
314
Non-English character e-mail host domain name database
First index table
Second index table
326
328
317
E-mail host IP address database
To Network 102

FIG. 3

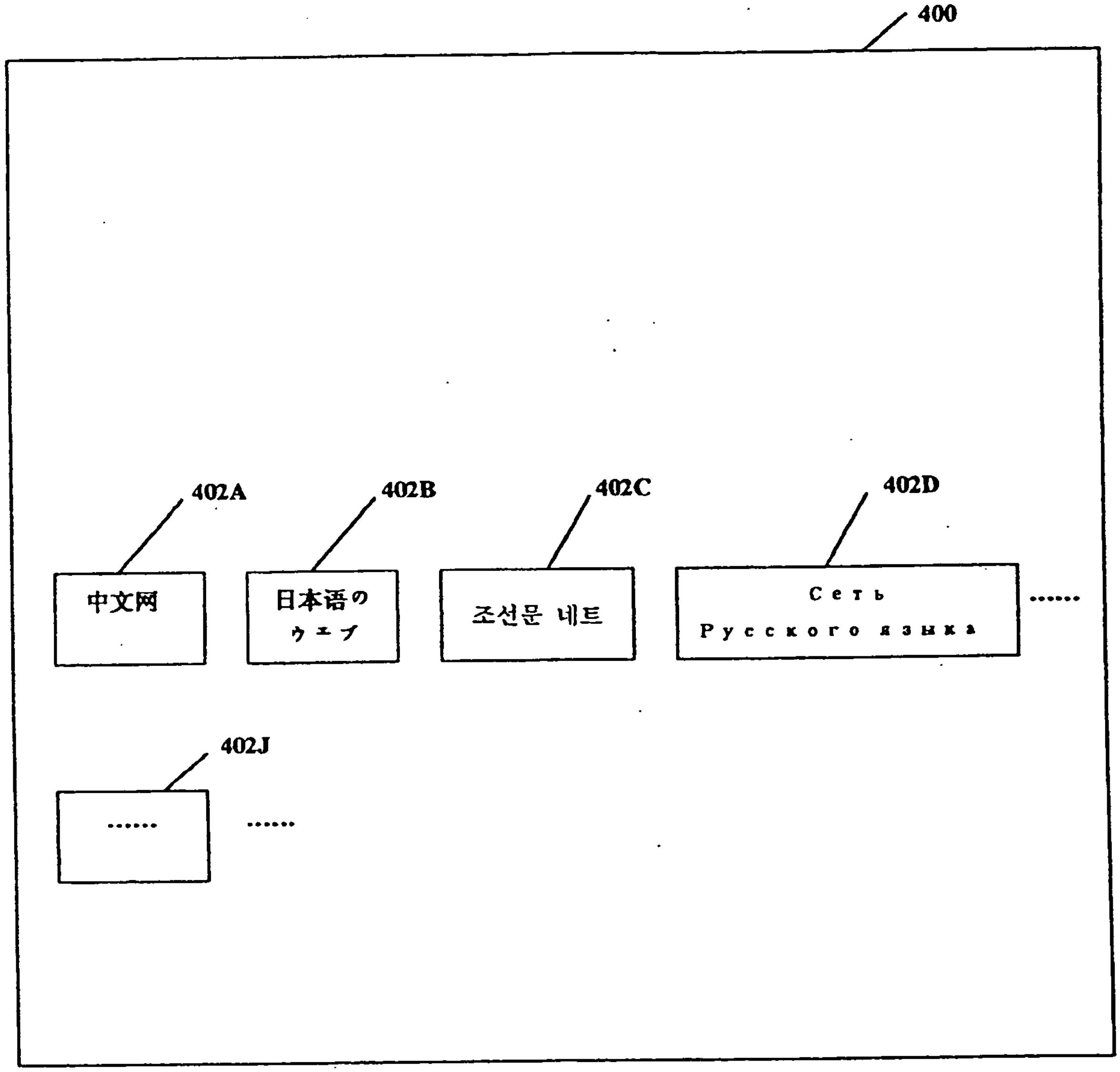

400
402A
中文网
402B
日本语の
ウエブ
402C
조선문 네트
402D
Сеть
Русского языка
......
402J
......
......

FIG. 4

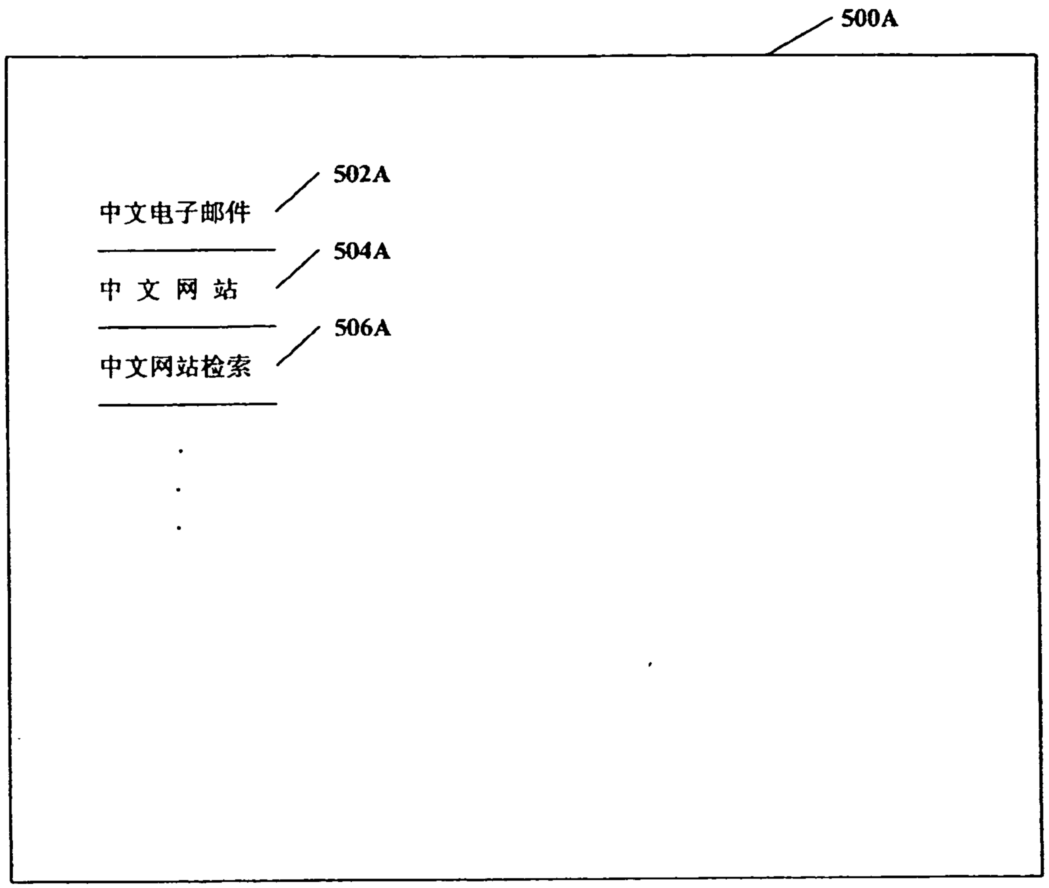

500A
502A
中文电子邮件
504A
中文网站
506A
中文网站检索

FIG. 5A

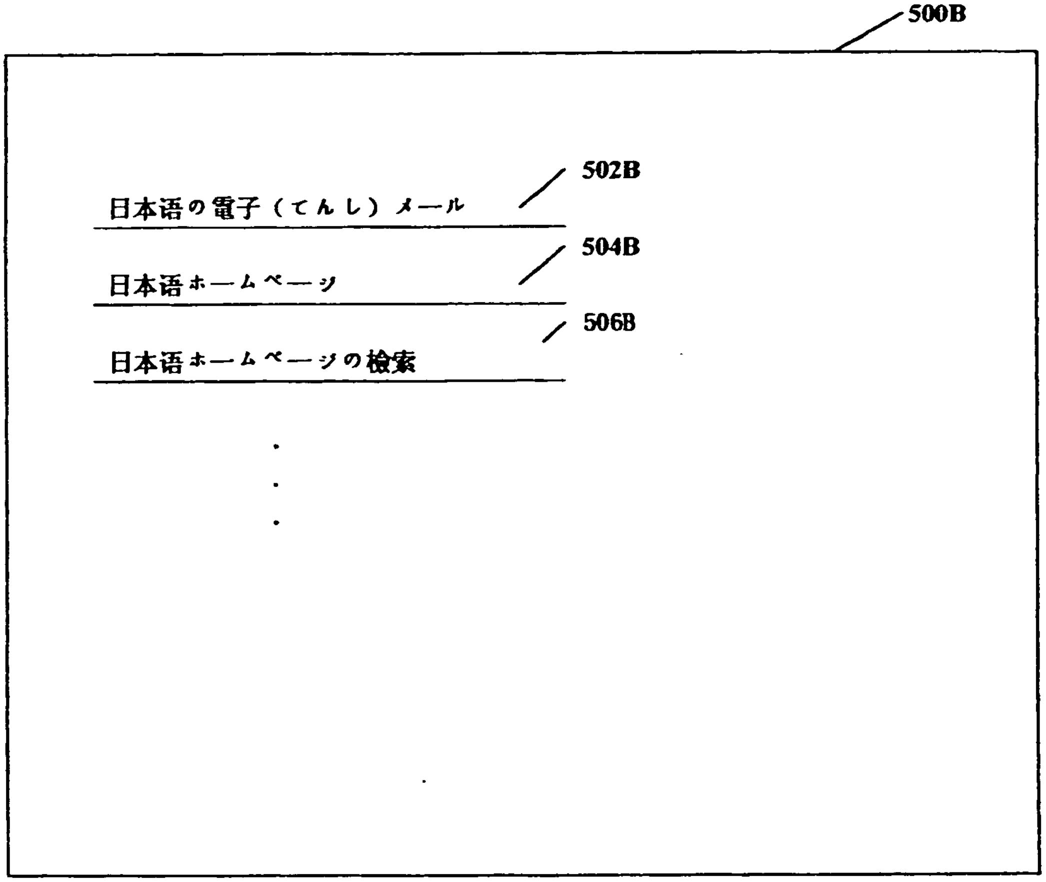

500B
502B
日本語の電子（てんし）メール
504B
日本語ホームページ
506B
日本語ホームページの検索
·
·
·

FIG. 5B

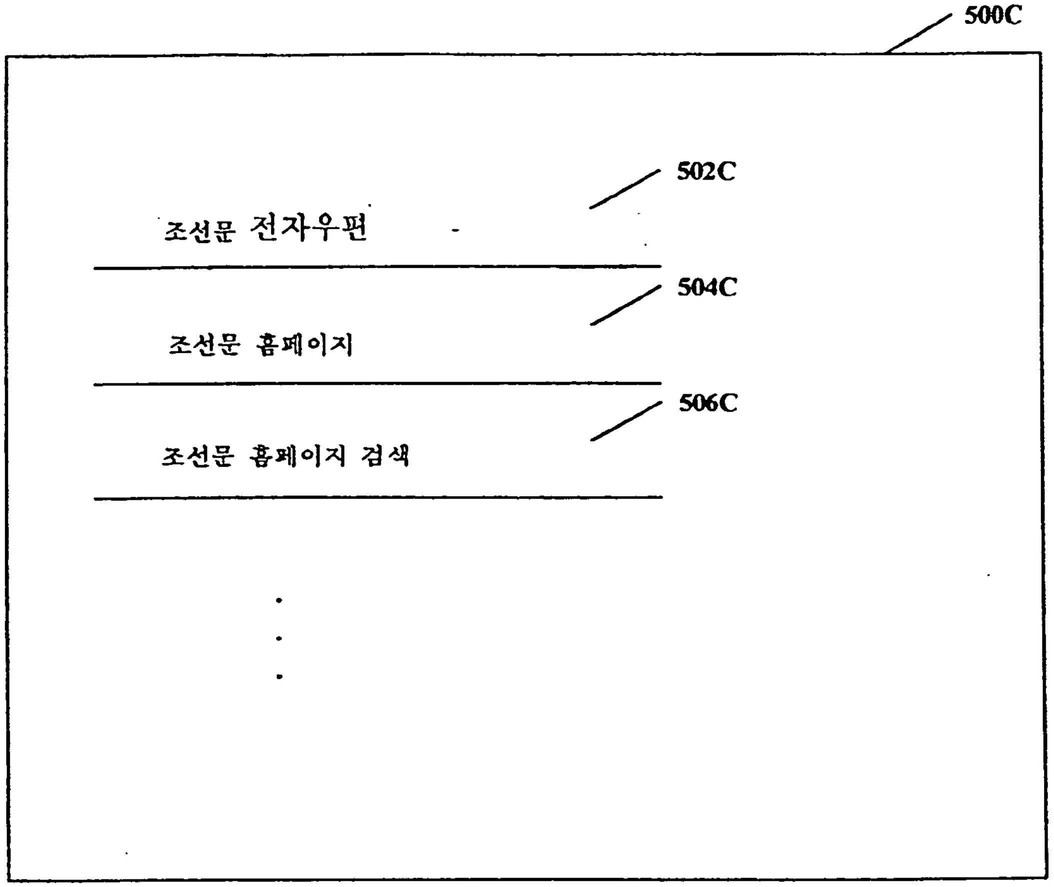
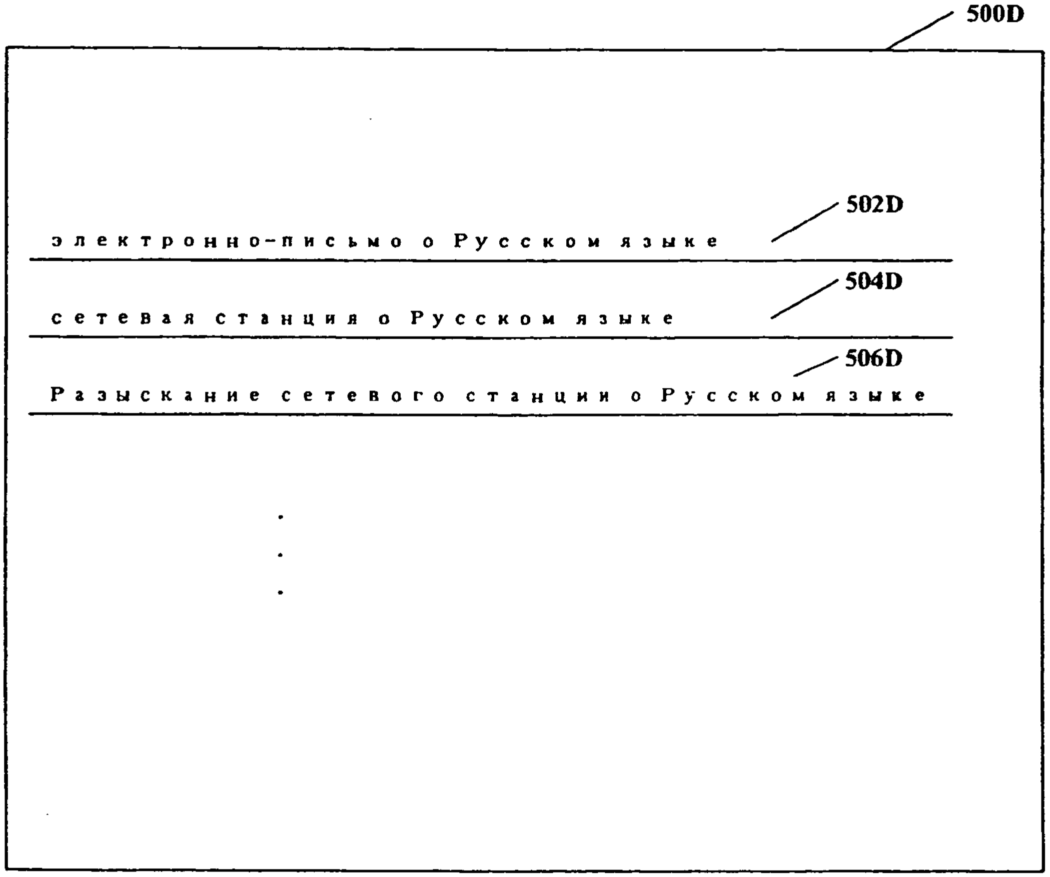

500C
502C
조선문 전자우편
504C
조선문 홈페이지
506C
조선문 홈페이지 검색

FIG. 5C


500D
502D
504D
506D

электронно-письмо о Русском языке

сетевая станция о Русском языке

Разыскание сетевого станции о Русском языке

FIG. 5D

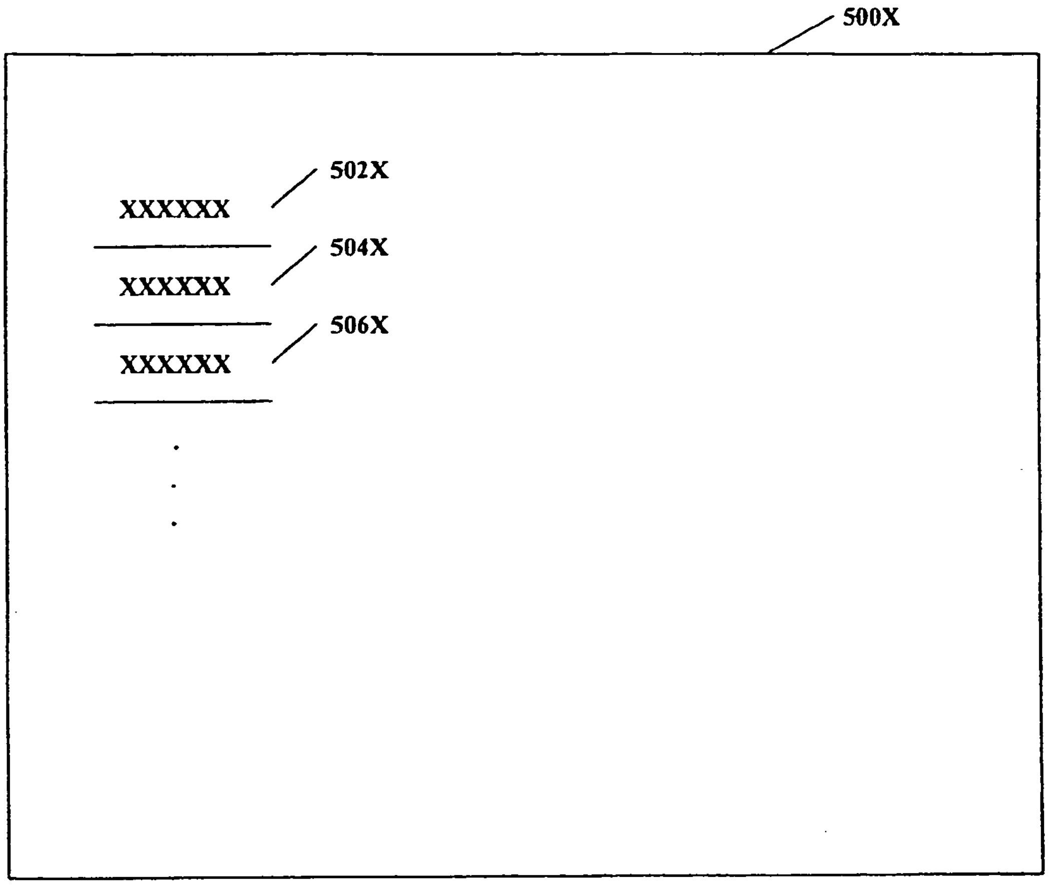
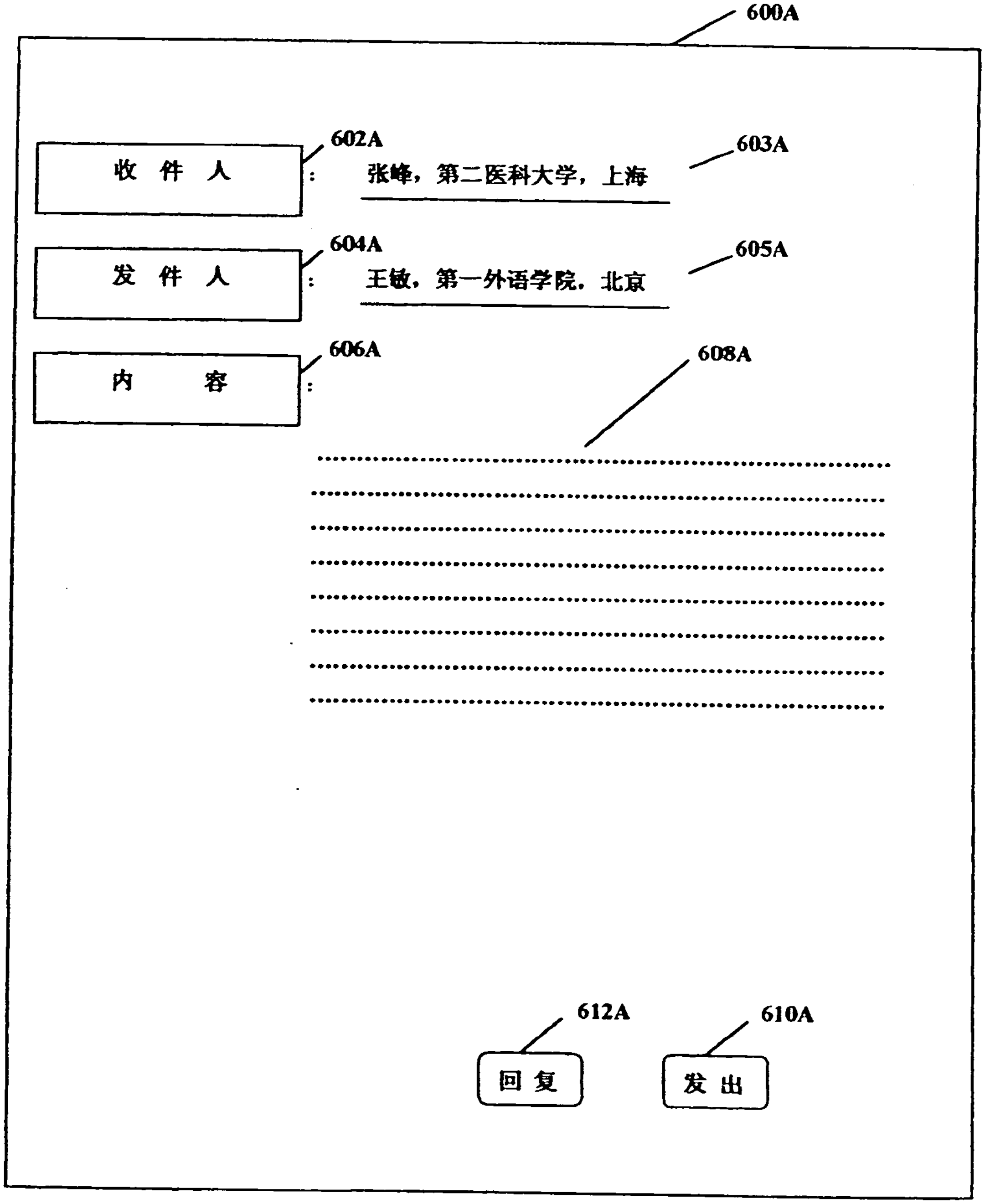

500X
502X
XXXXXX
504X
XXXXXX
506X
XXXXXX

FIG. 5X



收件人：张峰，第二医科大学，上海

发件人：王敏，第一外语学院，北京

内容：

600A
602A
603A
604A
605A
606A
608A
612A
610A
回复
发出

FIG. 6A

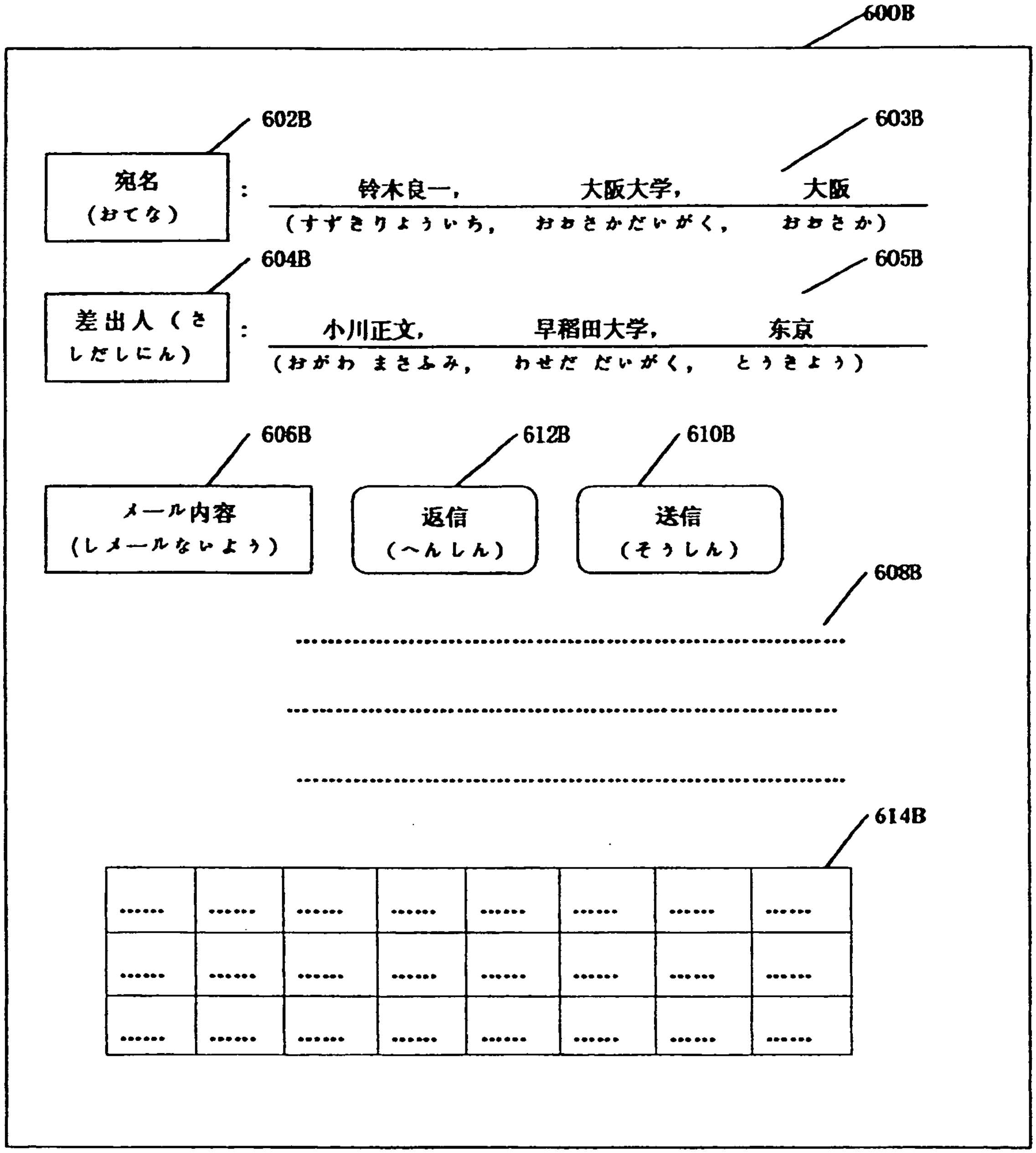

600B
602B
603B
宛名
（おてな）
:
鈴木良一，　大阪大学，　大阪
（すずきりよういち，　おおさかだいがく，　おおさか）
604B
605B
差出人（さしだしにん）
:
小川正文，　早稲田大学，　东京
（おがわ まさふみ，　わせだ だいがく，　とうきよう）
606B
612B
610B
メール内容
（しメールないよう）
返信
（へんしん）
送信
（そうしん）
608B
614B

FIG. 6B

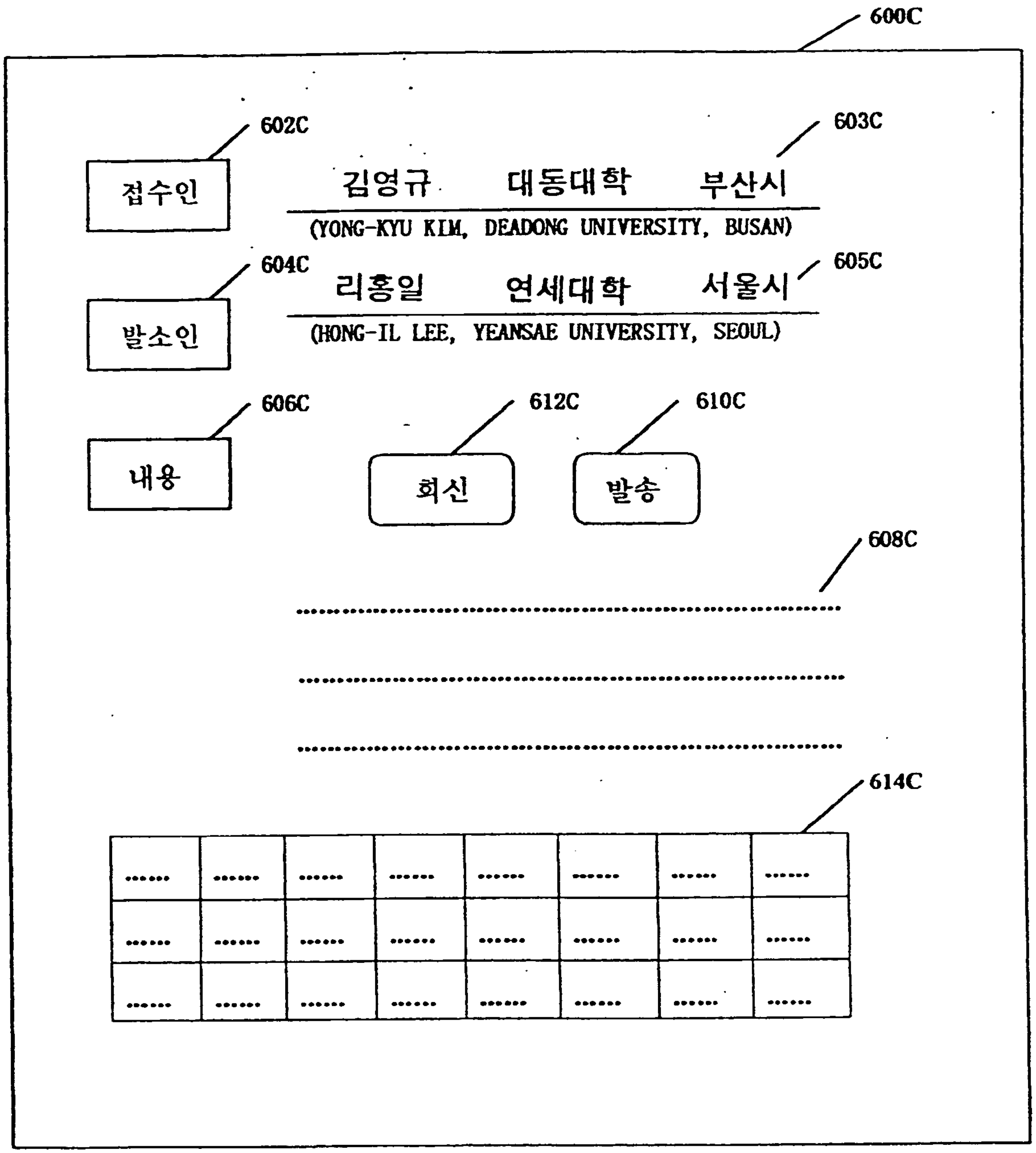
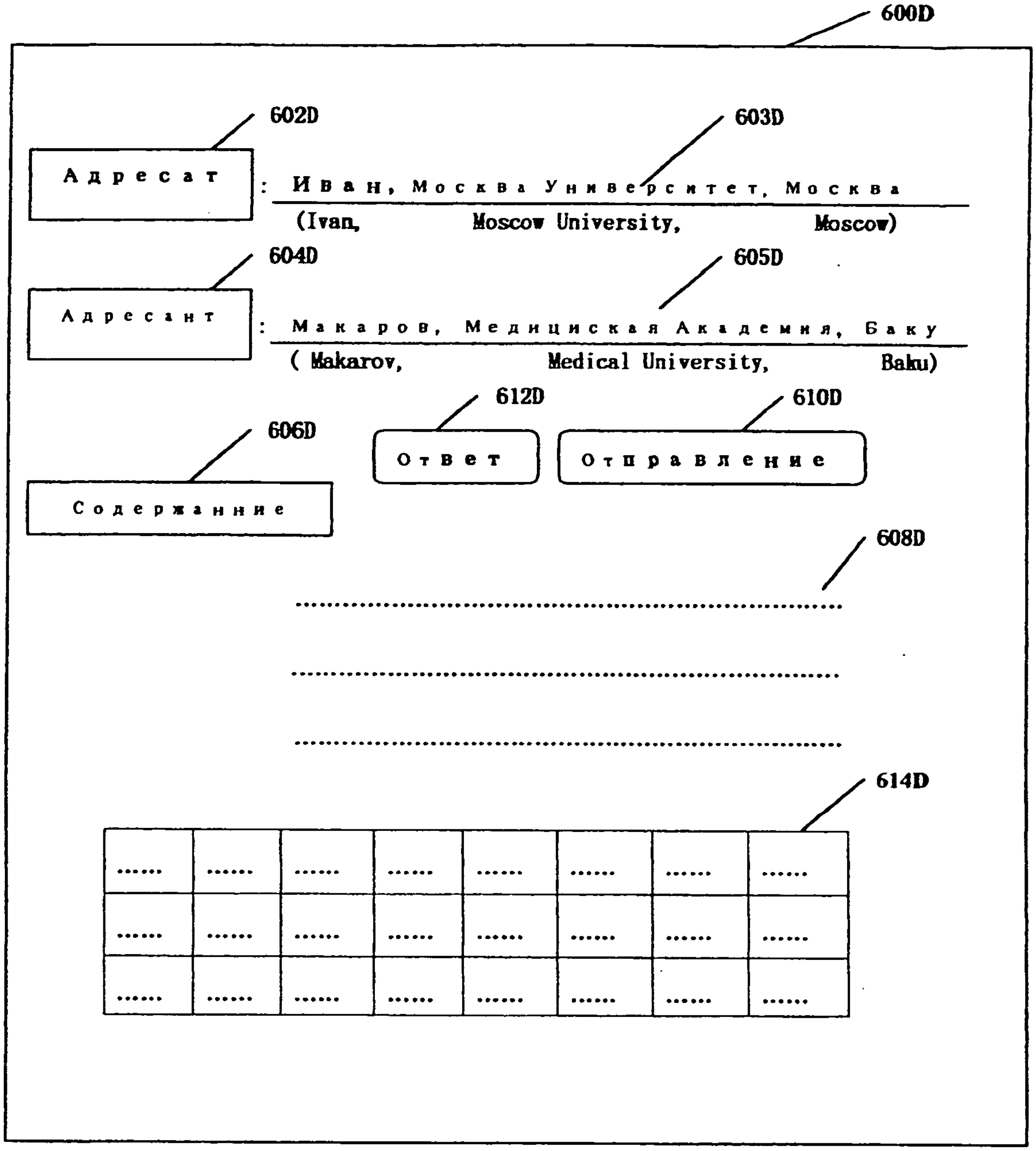

600C
602C
접수인
603C
김영규 대동대학 부산시
(YONG-KYU KIM, DEADONG UNIVERSITY, BUSAN)
604C
605C
발소인
리홍일 연세대학 서울시
(HONG-IL LEE, YEANSAE UNIVERSITY, SEOUL)
606C
내용
612C
회신
610C
발송
608C
614C

FIG. 6C


600D
602D
603D
604D
605D
606D
608D
610D
612D
614D
Адресат
Адресант
Ответ
Отправление
Содержанние

Адресат : Иван, Москва Университет, Москва
(Ivan, Moscow University, Moscow)

Адресант : Макаров, Медицинская Академия, Баку
(Makarov, Medical University, Baku)

图 6D

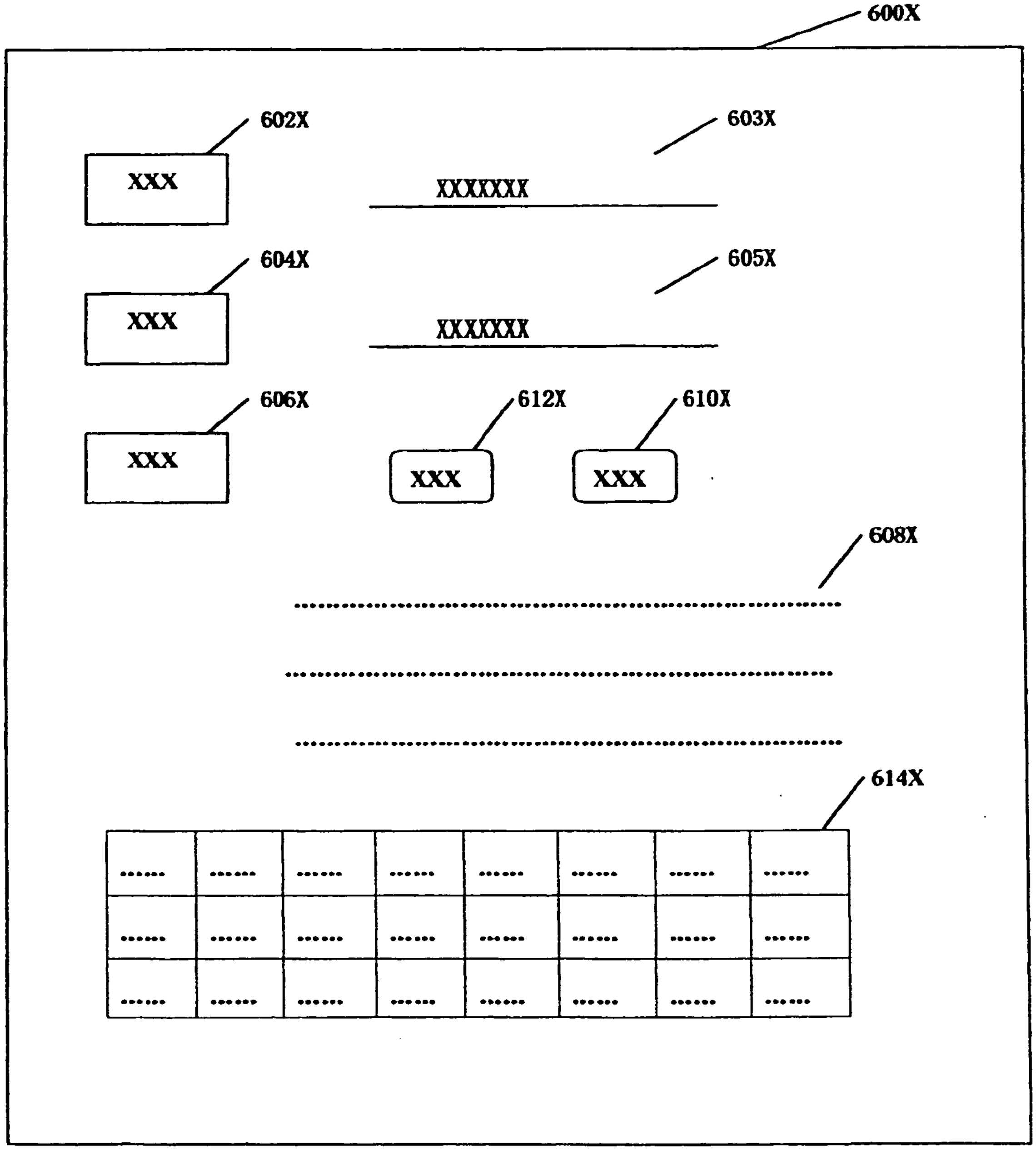

600X
602X
XXX
603X
XXXXXXX
604X
XXX
605X
XXXXXXX
606X
XXX
612X
XXX
610X
XXX
608X
614X

FIG. 6X

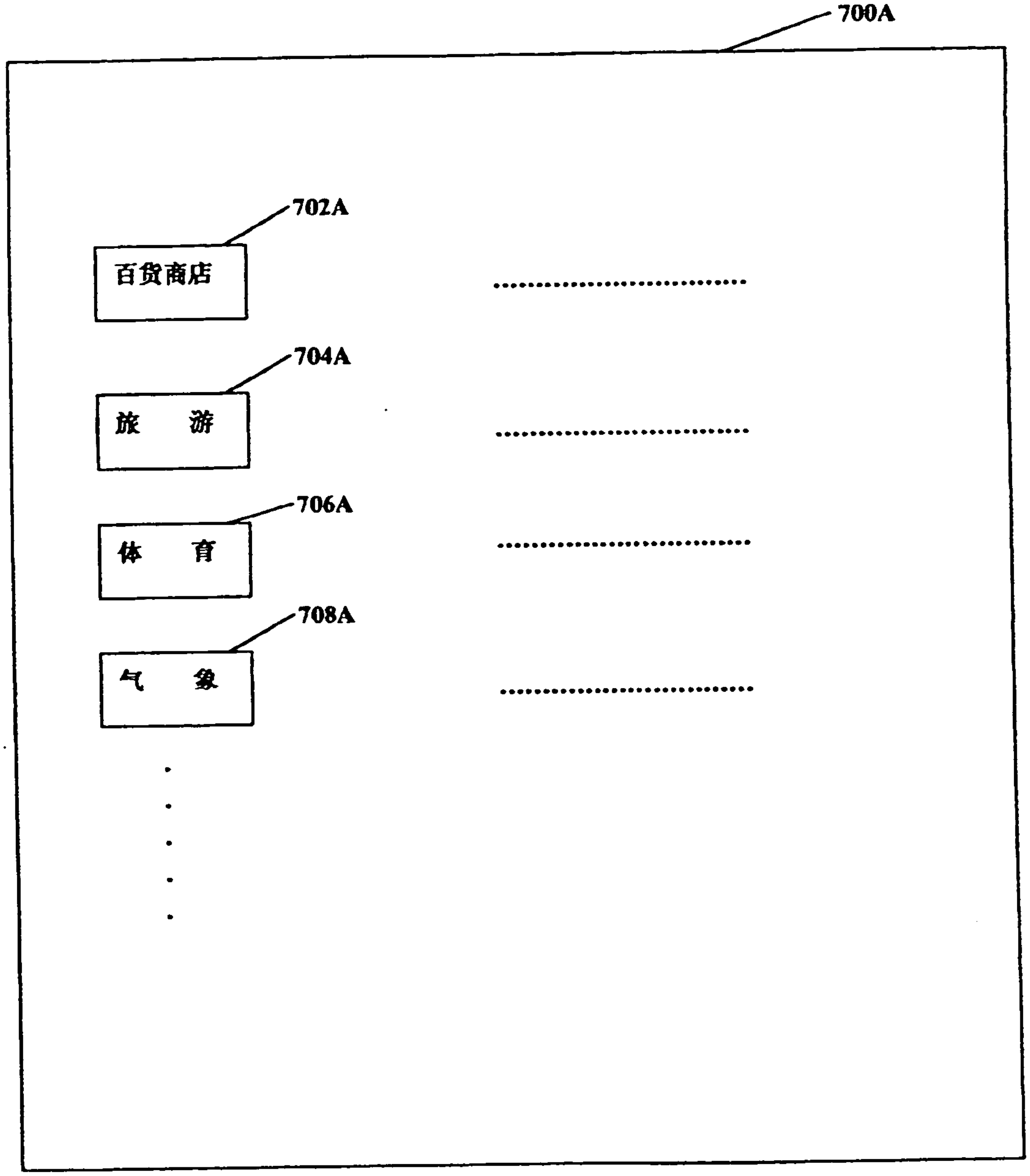

700A
702A
百货商店
704A
旅　游
706A
体　育
708A
气　象

FIG. 7A

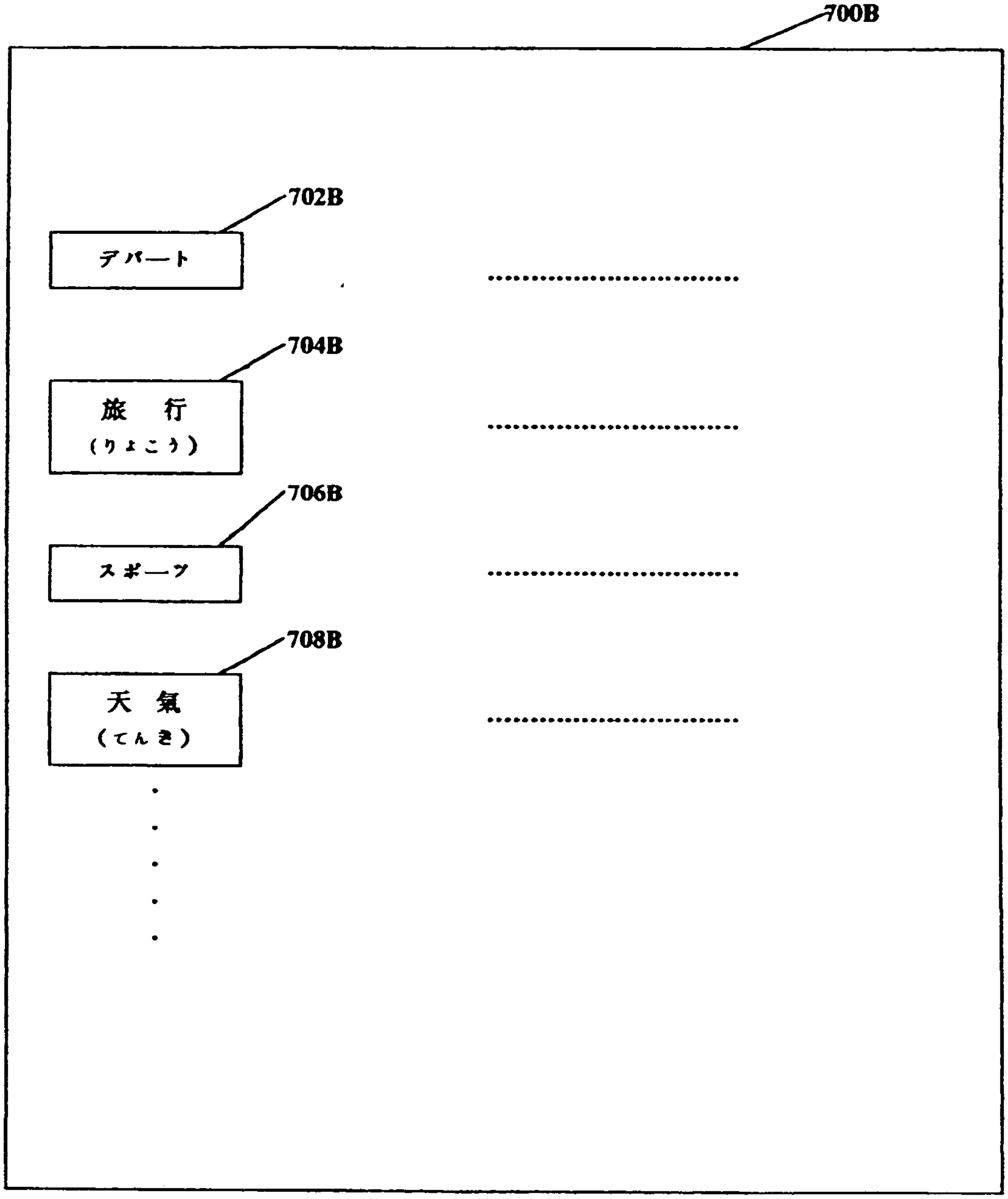

700B
702B
デパート
704B
旅 行
(りょこう)
706B
スポーツ
708B
天 氣
(てんき)

FIG. 7B

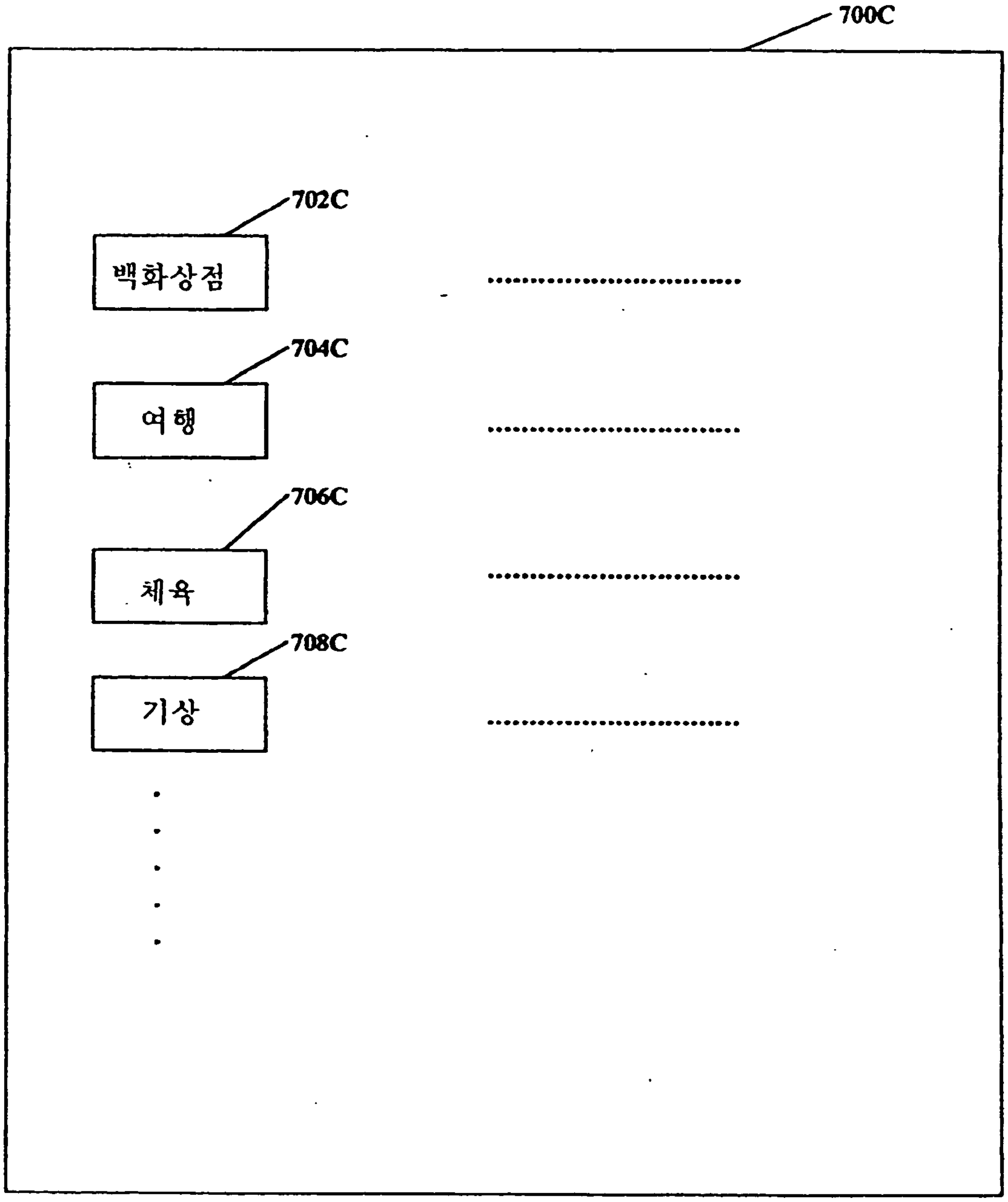

700C
702C
백화상점
704C
여행
706C
체육
708C
기상

FIG.7C

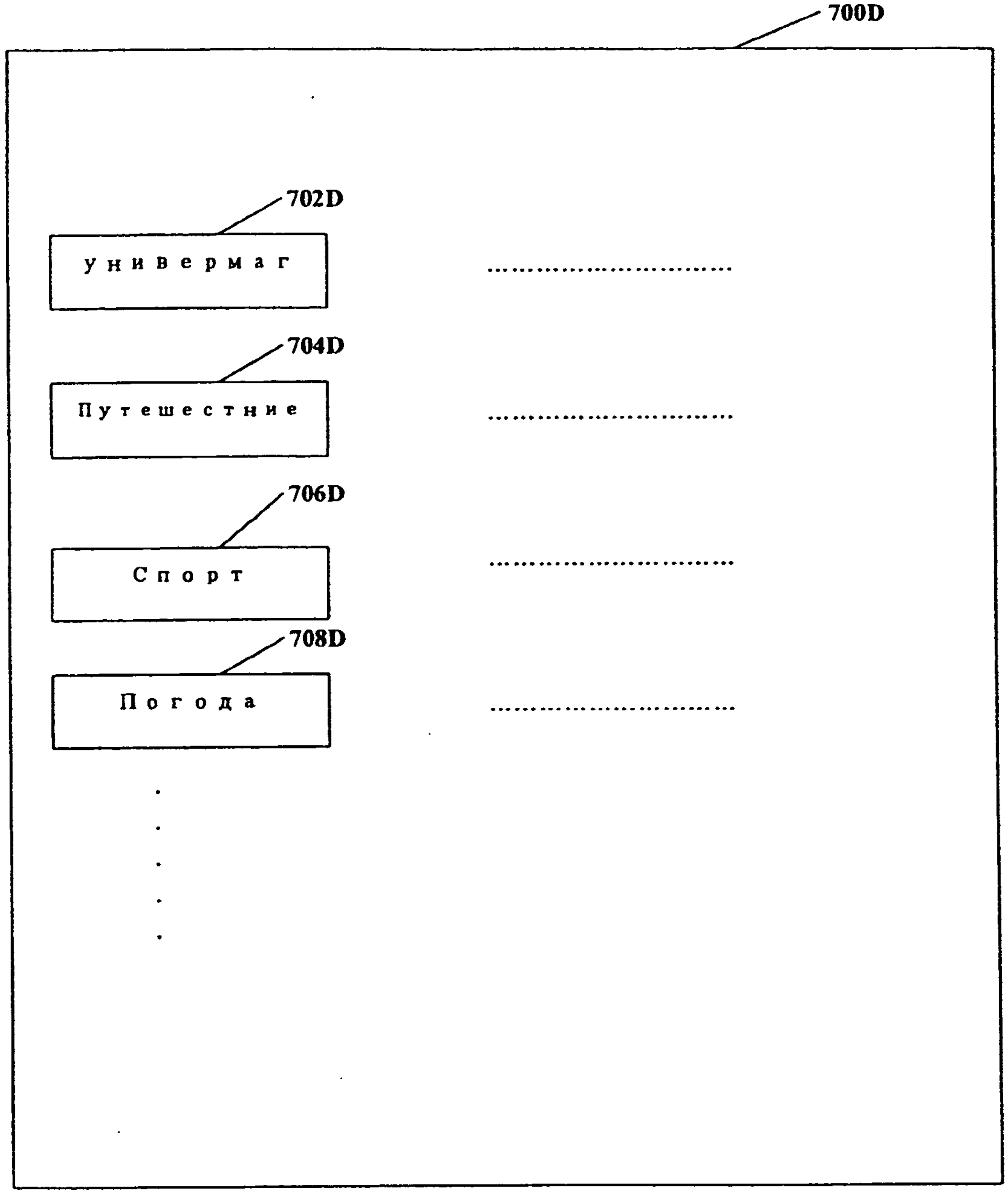

700D
702D
универмаг
704D
Путешестние
706D
Спорт
708D
Погода

FIG.7D

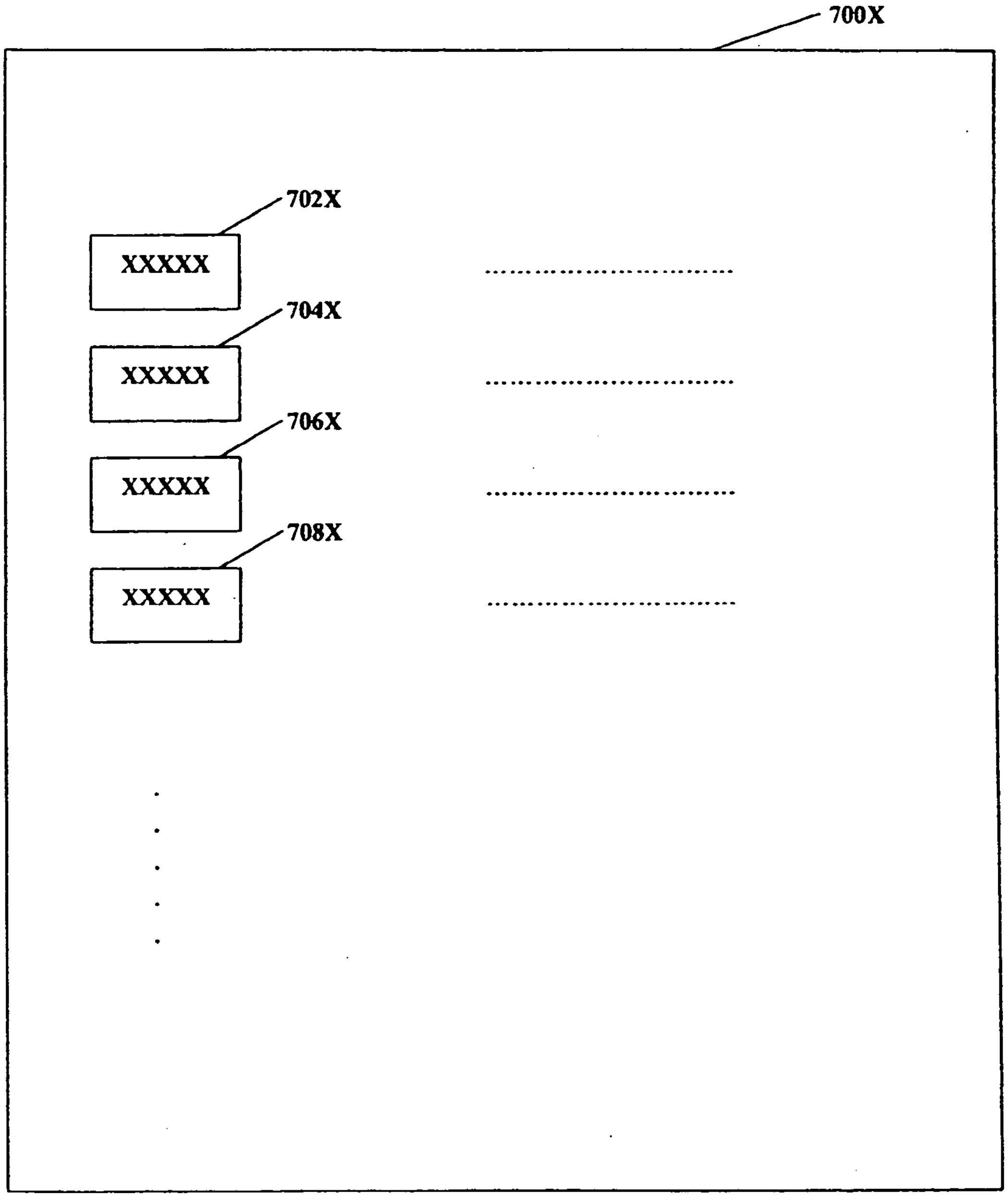

700X
702X
XXXXX
704X
XXXXX
706X
XXXXX
708X
XXXXX

FIG. 7X

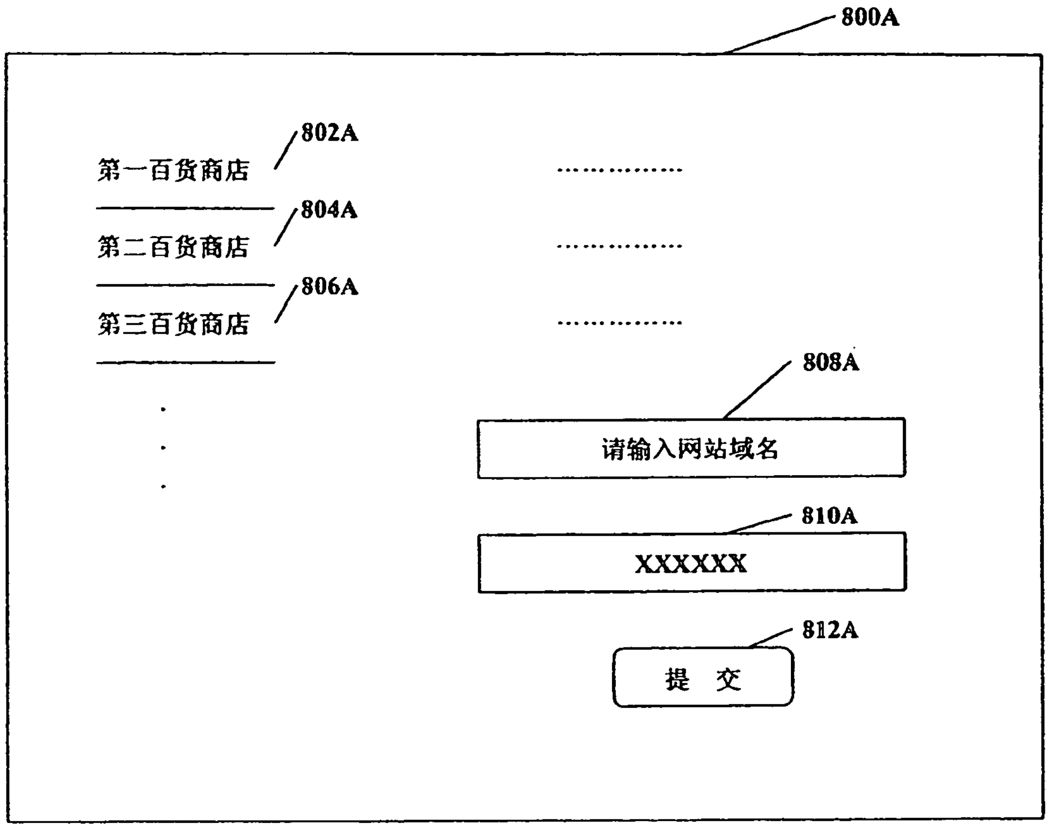

800A
802A
第一百货商店
804A
第二百货商店
806A
第三百货商店
808A
请输入网站域名
810A
XXXXXX
812A
提 交

FIG. 8A

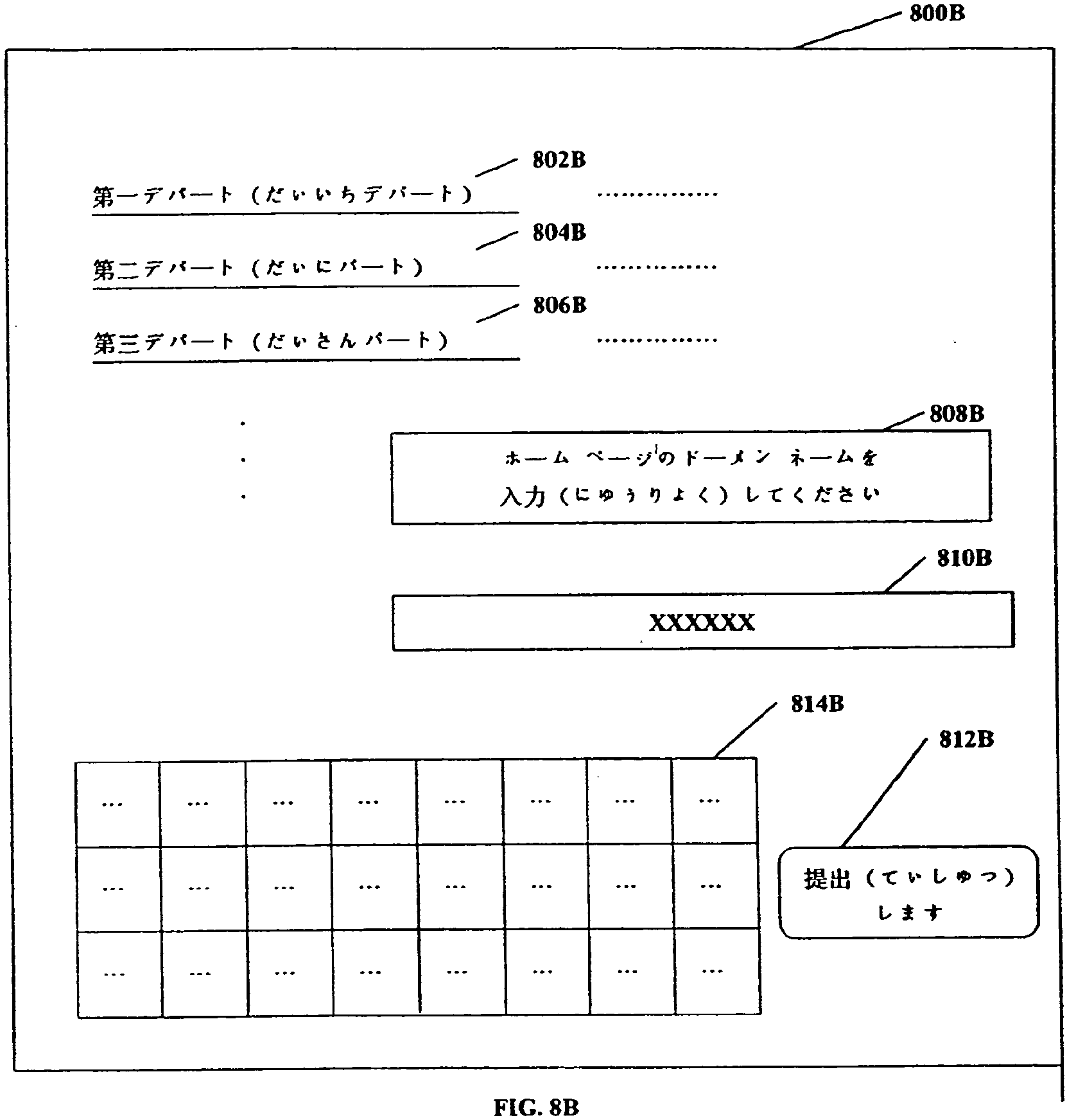

800B
802B
第一デパート（だいいちデパート）
804B
第二デパート（だいにパート）
806B
第三デパート（だいさんパート）
808B
ホーム ページのドーメン ネームを
入力（にゅうりょく）してください
810B
XXXXXX
814B
812B
提出（ていしゅつ）します

FIG. 8B

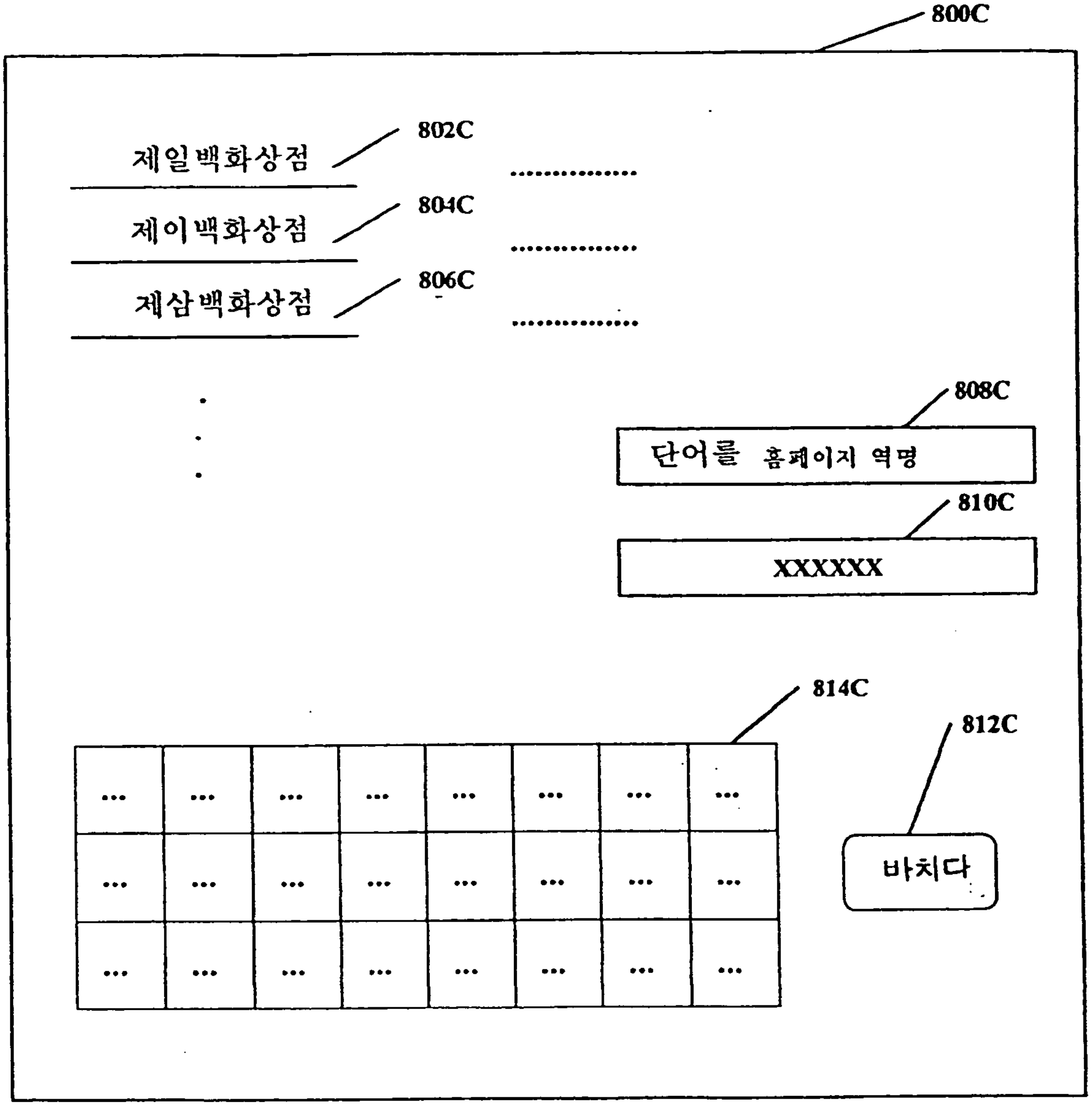

800C
제일백화상점
802C
제이백화상점
804C
제삼백화상점
806C
808C
단어를 홈페이지 역명
810C
XXXXXX
814C
812C
바치다

FIG. 8C

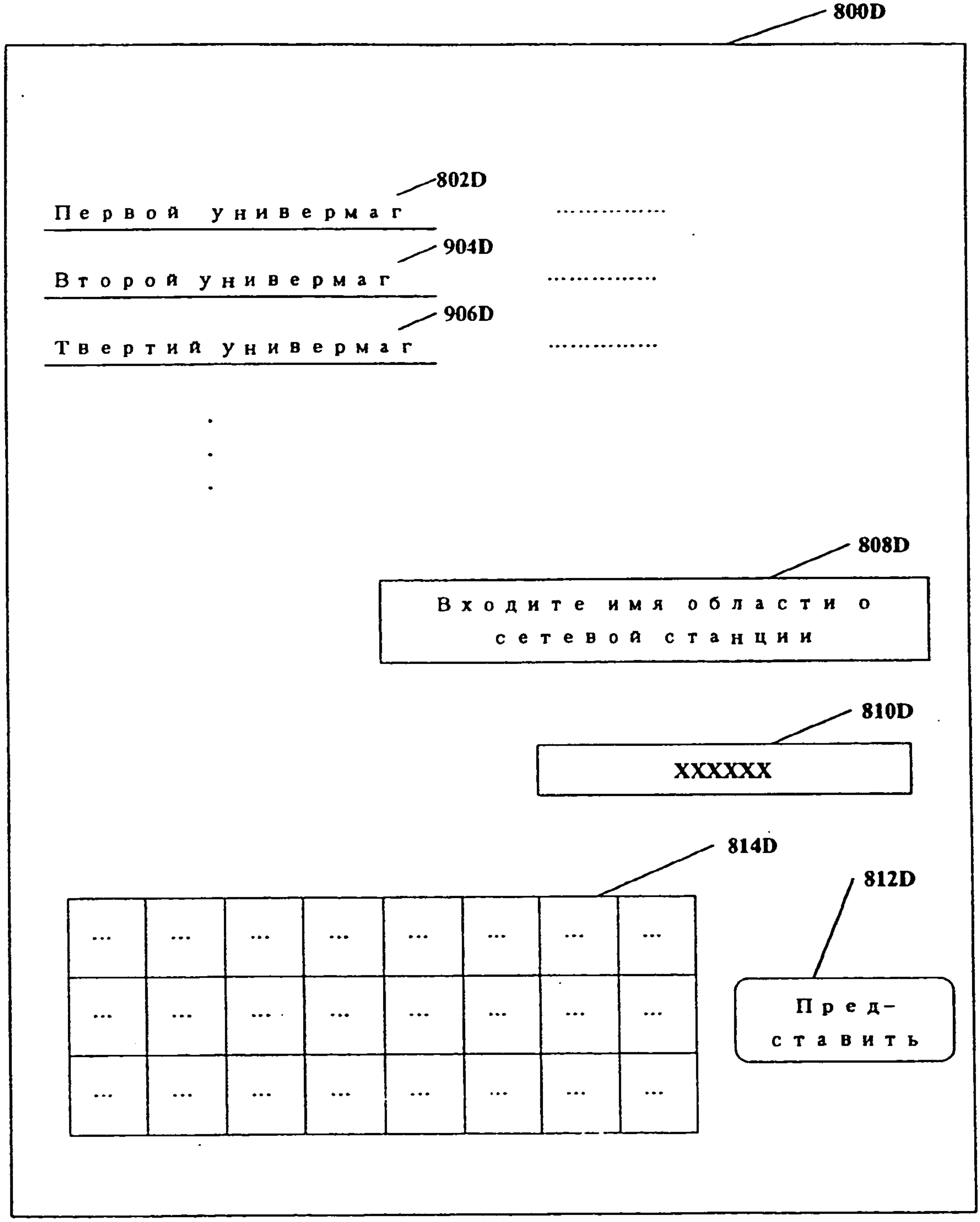

800D
802D
Первой универмаг
904D
Второй универмаг
906D
Твертий универмаг
808D
Входите имя области о сетевой станции
810D
XXXXXX
814D
812D
Пред-ставить

FIG. 8D

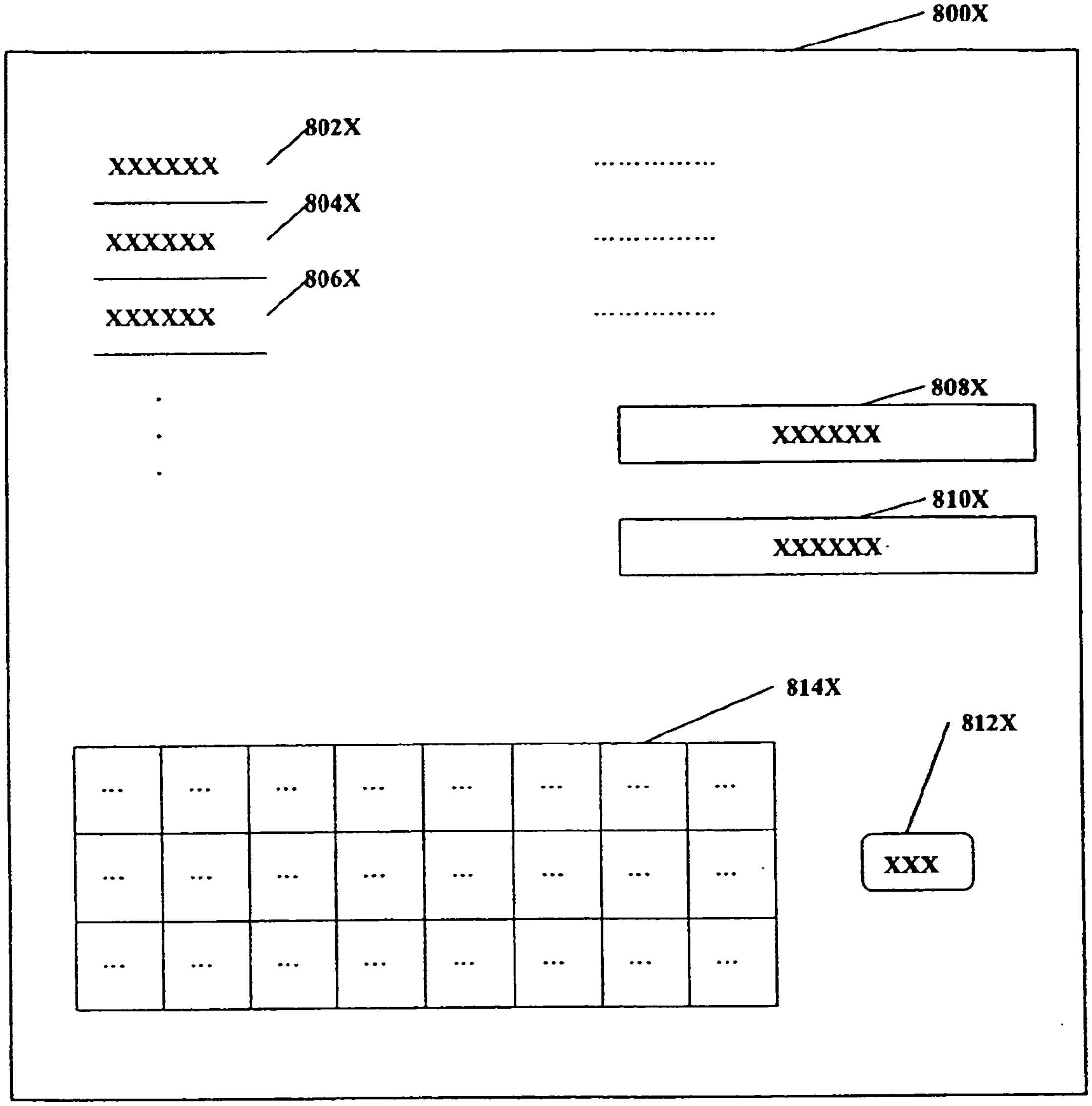

800X
802X
XXXXXX
804X
XXXXXX
806X
XXXXXX
808X
XXXXXX
810X
XXXXXX
814X
812X
XXX

FIG. 8X

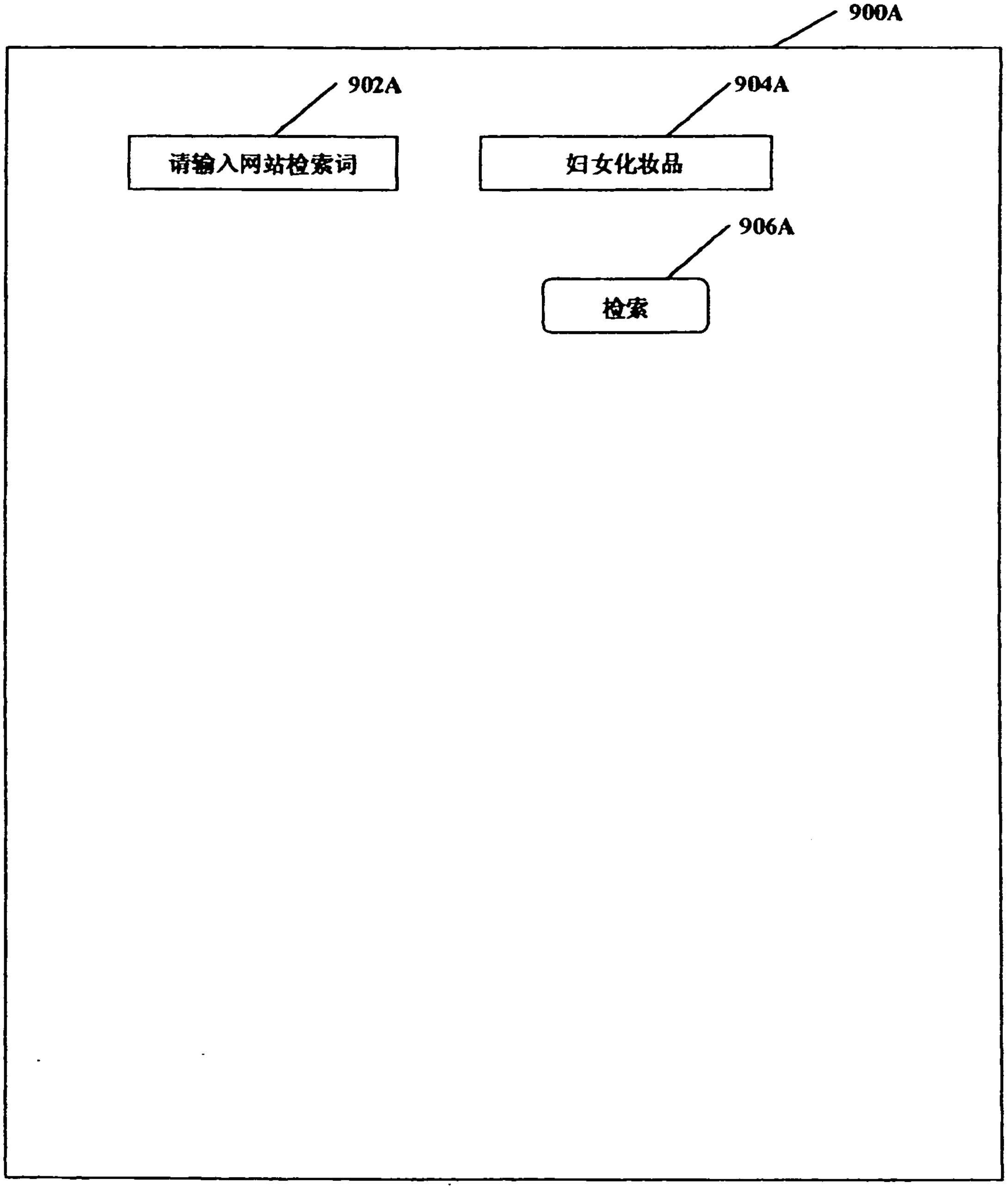
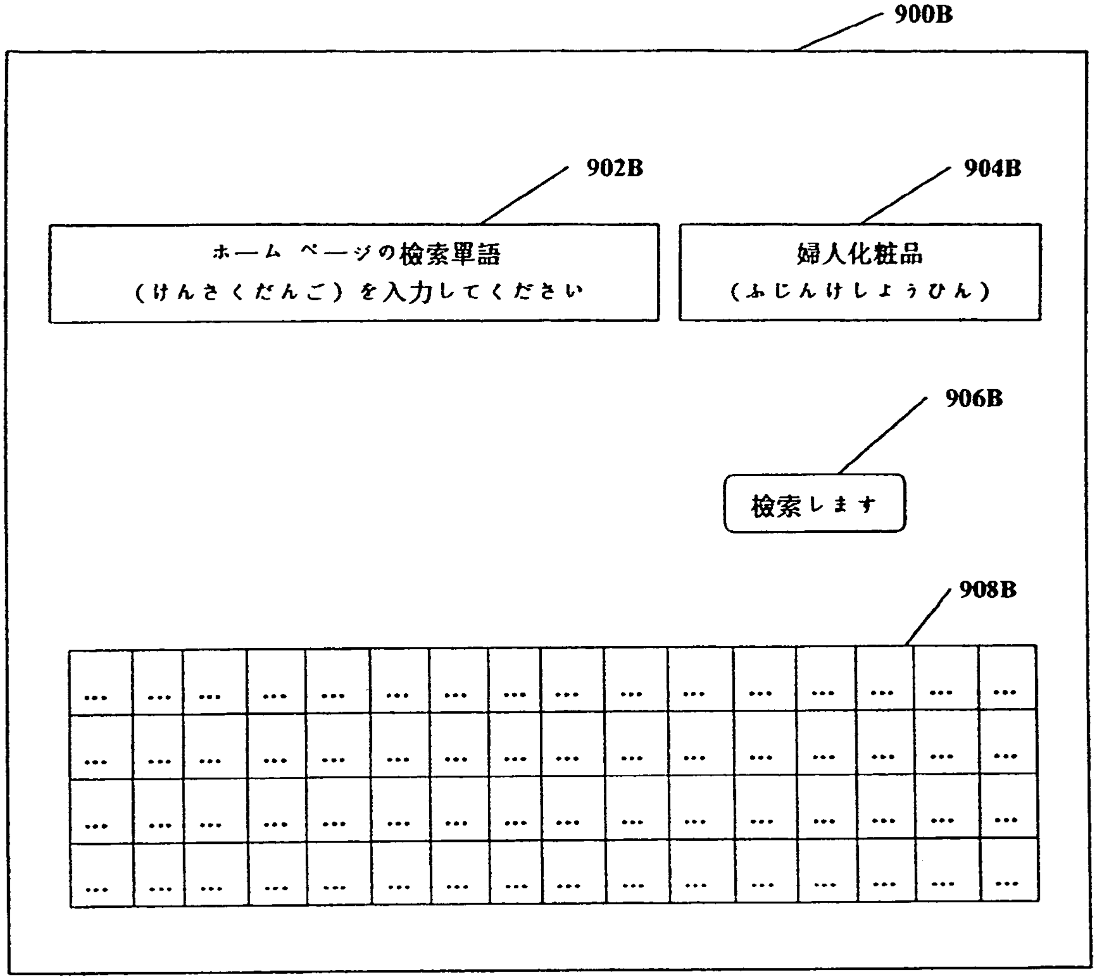

900A
902A
请输入网站检索词
904A
妇女化妆品
906A
检索

FIG. 9A


900B
902B
904B
906B
検索します
908B
...

ホーム ページの検索單語
（けんさくだんご）を入力してください

婦人化粧品
（ふじんけしょうひん）

FIG. 9B

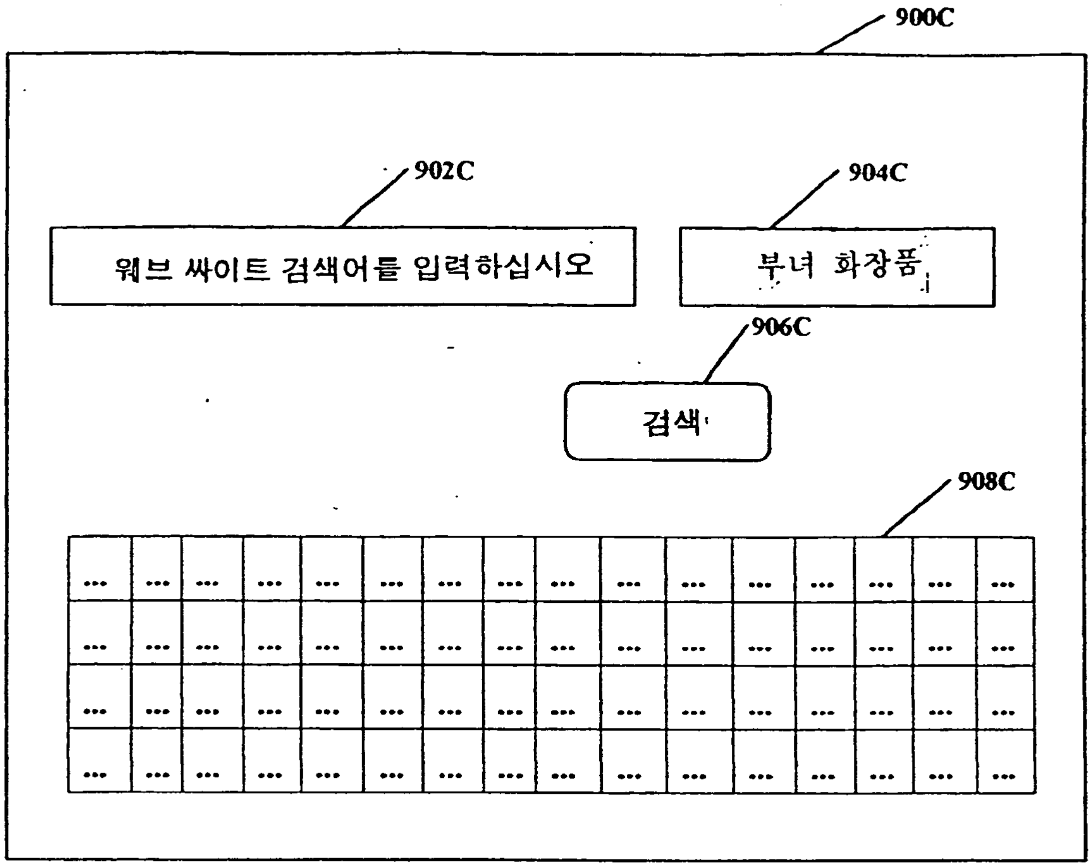

900C
902C
904C
906C
908C
웨브 싸이트 검색어를 입력하십시오
부녀 화장품
검색

FIG. 9C

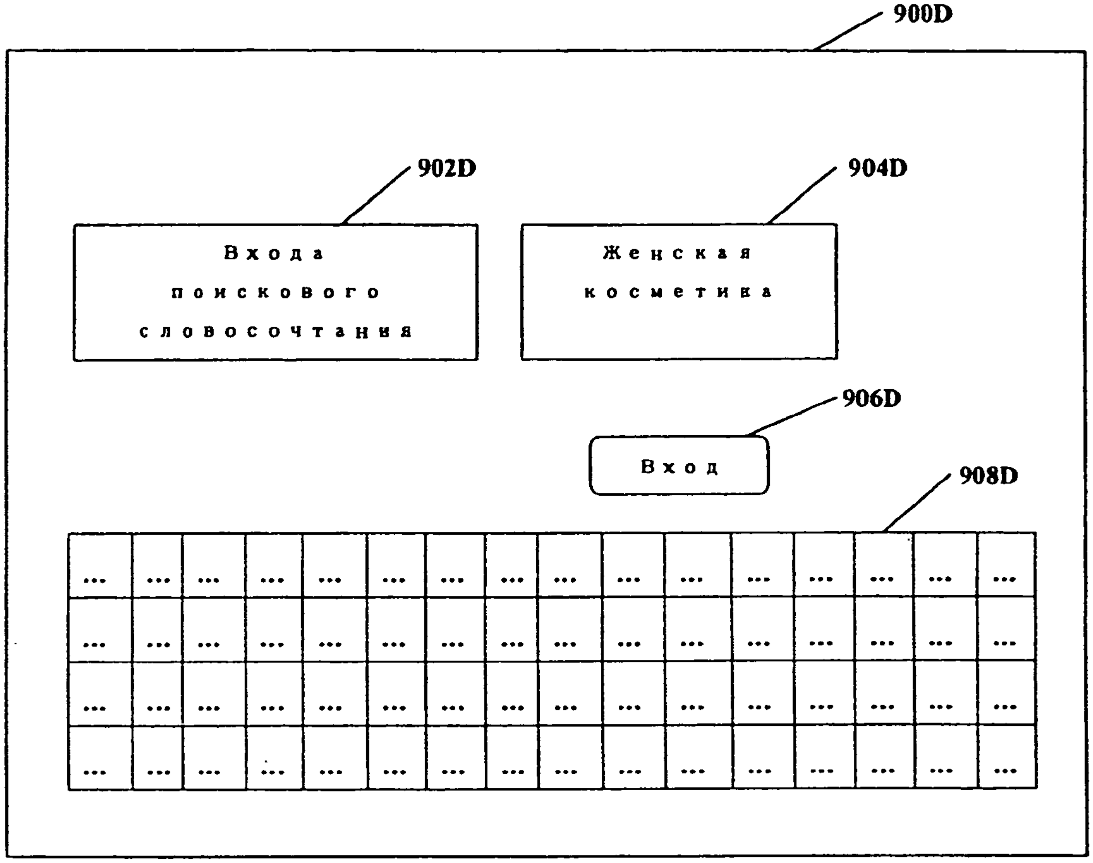

900D
902D
Входа
поискового
словосочтания
904D
Женская
косметика
906D
Вход
908D
...

FIG. 9D

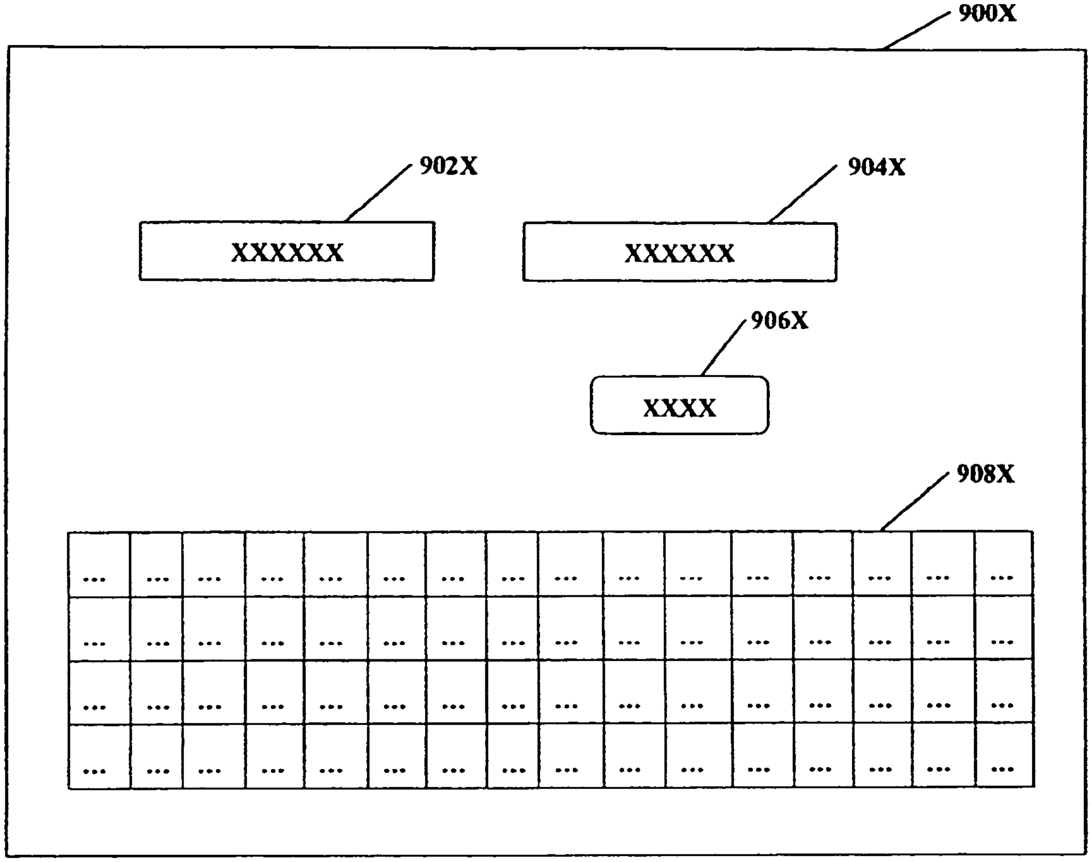

900X
902X
XXXXXX
904X
XXXXXX
906X
XXXX
908X

FIG. 9X

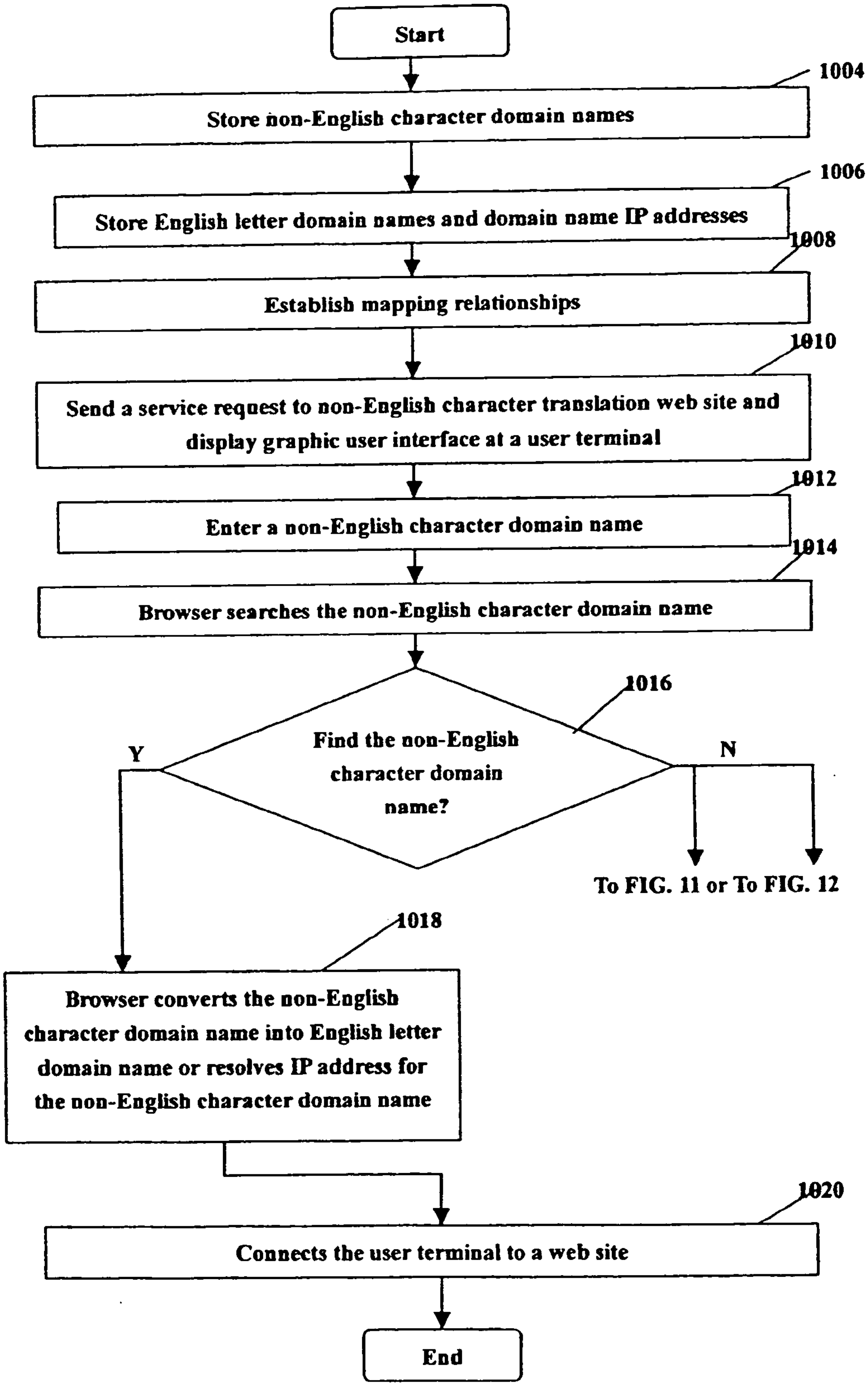

Start
1004
Store non-English character domain names
1006
Store English letter domain names and domain name IP addresses
1008
Establish mapping relationships
1010
Send a service request to non-English character translation web site and display graphic user interface at a user terminal
1012
Enter a non-English character domain name
1014
Browser searches the non-English character domain name
1016
Find the non-English character domain name?
Y
N
To FIG. 11 or To FIG. 12
1018
Browser converts the non-English character domain name into English letter domain name or resolves IP address for the non-English character domain name
1020
Connects the user terminal to a web site
End

FIG. 10

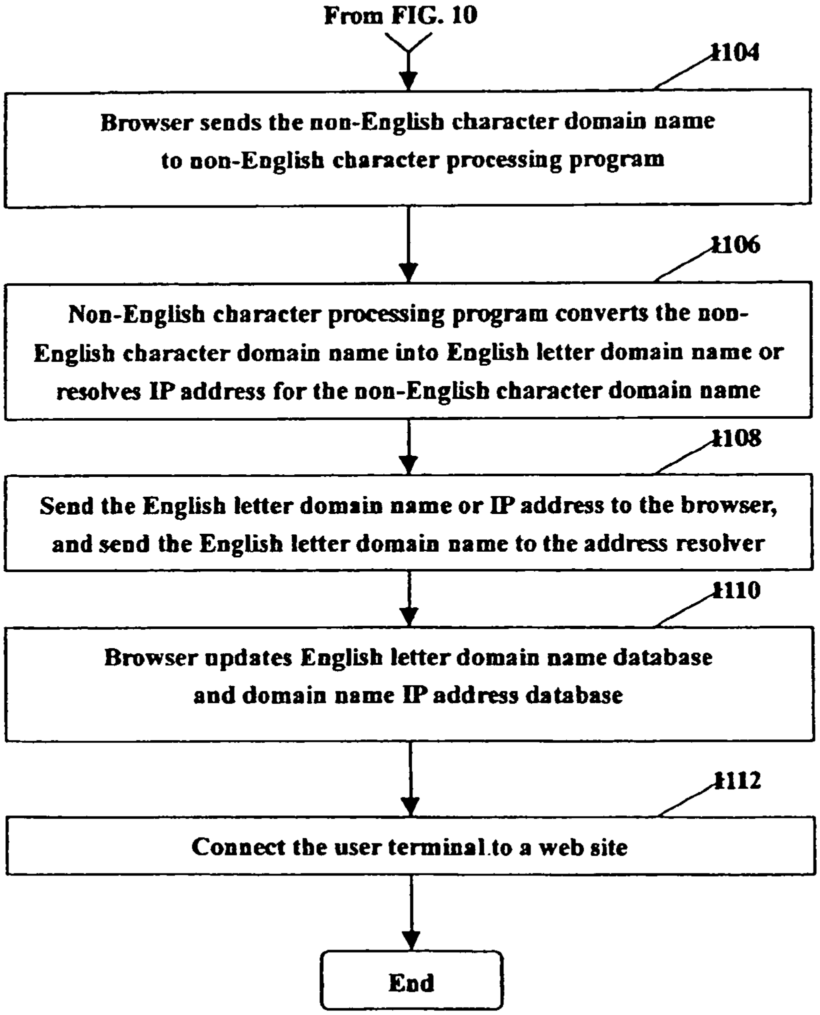
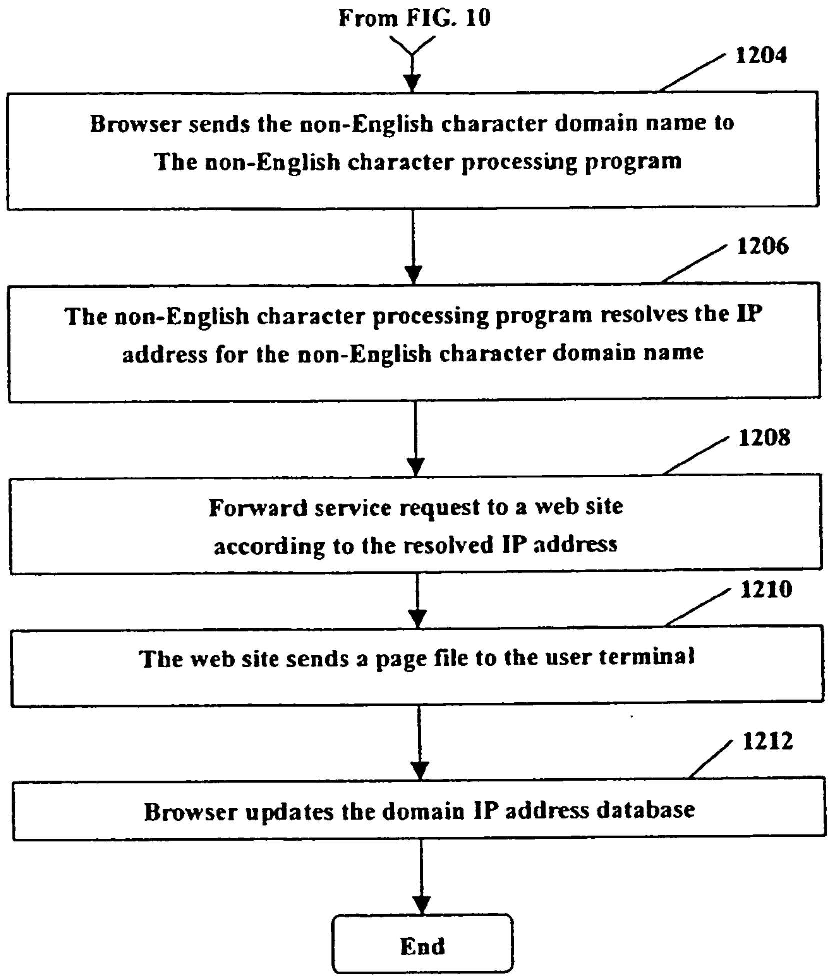

From FIG. 10
1104
Browser sends the non-English character domain name to non-English character processing program
1106
Non-English character processing program converts the non-English character domain name into English letter domain name or resolves IP address for the non-English character domain name
1108
Send the English letter domain name or IP address to the browser, and send the English letter domain name to the address resolver
1110
Browser updates English letter domain name database and domain name IP address database
1112
Connect the user terminal to a web site
End

FIG. 11



From FIG. 10
1204
Browser sends the non-English character domain name to The non-English character processing program
1206
The non-English character processing program resolves the IP address for the non-English character domain name
1208
Forward service request to a web site according to the resolved IP address
1210
The web site sends a page file to the user terminal
1212
Browser updates the domain IP address database
End

FIG. 12

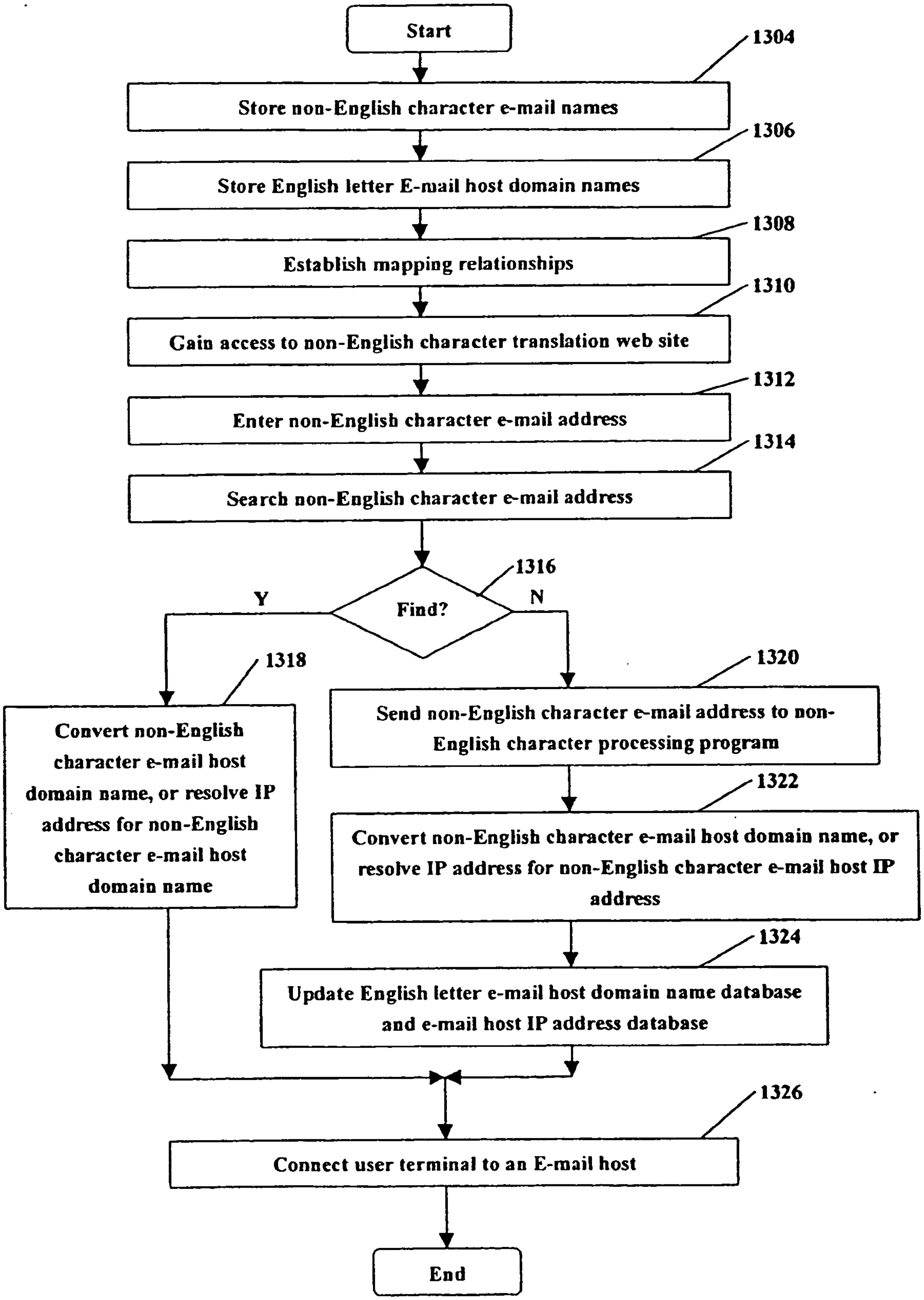

Start
1304
Store non-English character e-mail names
1306
Store English letter E-mail host domain names
1308
Establish mapping relationships
1310
Gain access to non-English character translation web site
1312
Enter non-English character e-mail address
1314
Search non-English character e-mail address
1316
Find?
Y
N
1318
Convert non-English character e-mail host domain name, or resolve IP address for non-English character e-mail host domain name
1320
Send non-English character e-mail address to non-English character processing program
1322
Convert non-English character e-mail host domain name, or resolve IP address for non-English character e-mail host IP address
1324
Update English letter e-mail host domain name database and e-mail host IP address database
1326
Connect user terminal to an E-mail host
End

FIG. 13

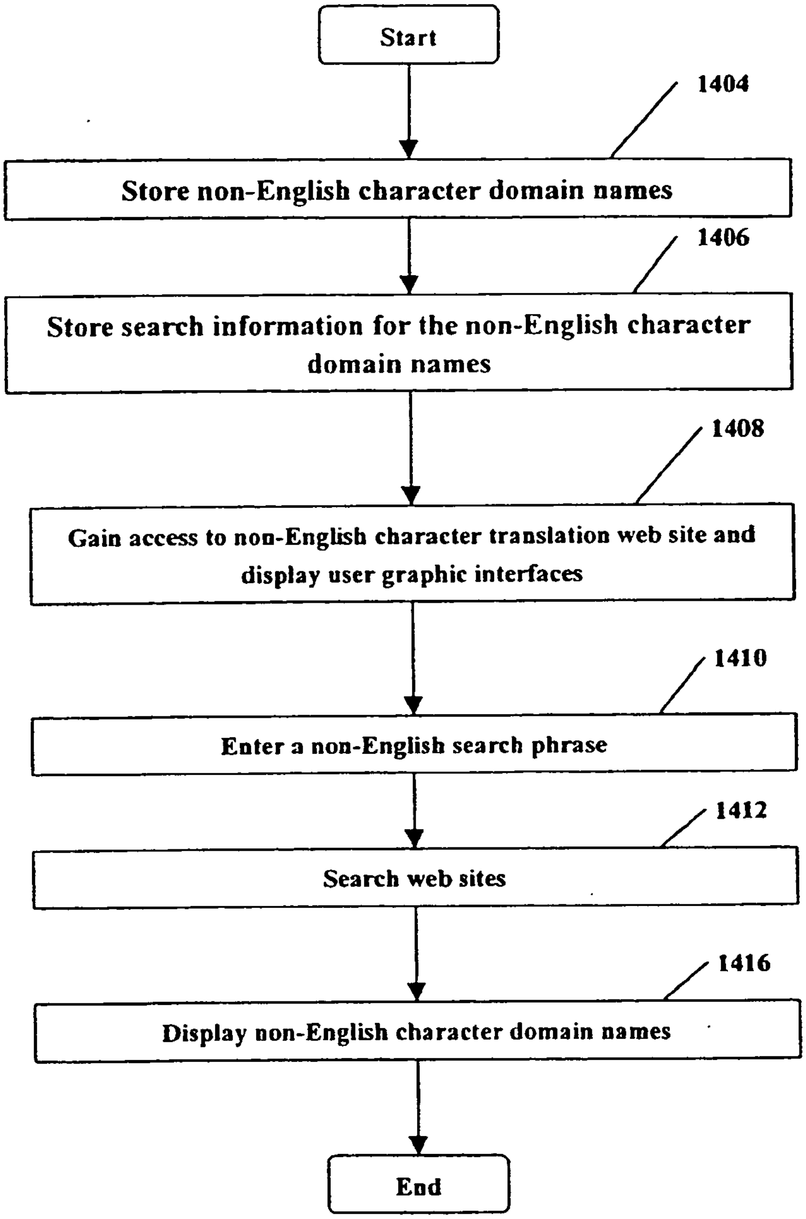

Start
1404
Store non-English character domain names
1406
Store search information for the non-English character domain names
1408
Gain access to non-English character translation web site and display user graphic interfaces
1410
Enter a non-English search phrase
1412
Search web sites
1416
Display non-English character domain names
End

FIG. 14

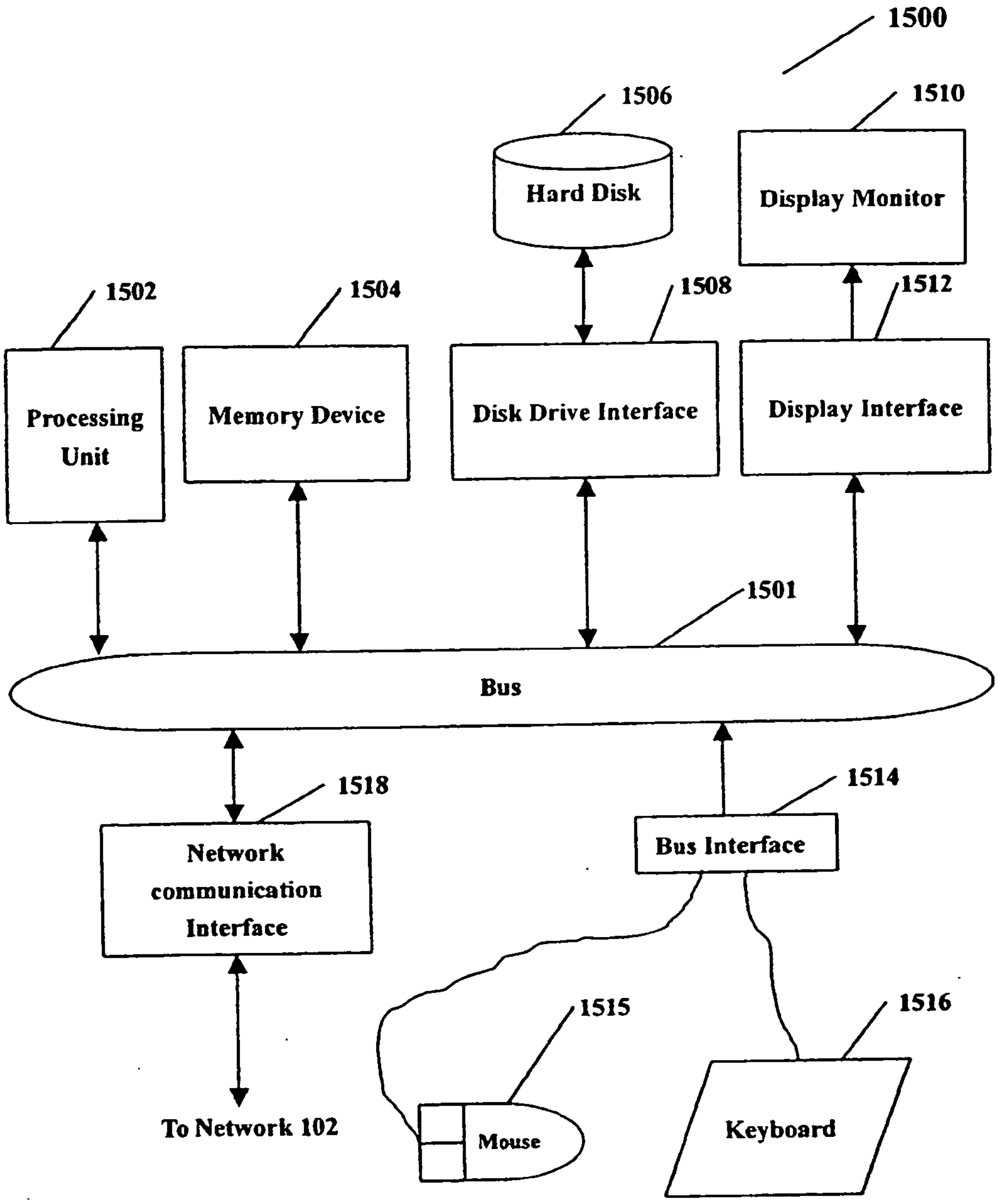

1500
1506
Hard Disk
1510
Display Monitor
1502
1504
1508
1512
Processing Unit
Memory Device
Disk Drive Interface
Display Interface
1501
Bus
1518
1514
Network communication Interface
Bus Interface
1515
1516
To Network 102
Mouse
Keyboard

FIG. 15